

## **Facilities & Other Resources**

### **The George Washington University Milken Institute School of Public Health**

Collated by:

**The Office of Research Excellence (ORE), GWSPH**

With Support of

GW Research Public Health and Law Research Support Team

Approved by:

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Head, GW Public Health and Law Research Support

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Instructions:

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## **SECTION 1: Environment**

**The George Washington University (GW)** was founded by charter in 1821 through an Act of Congress, fulfilling President George Washington's vision of an academic institution in the nation's capital. GW remains the largest institution of higher education in the District of Columbia and consists of three campuses (Foggy Bottom and Mount Vernon in Washington, DC, and the Virginia Science and Technology Campus in Ashburn, Virginia), along with several graduate education centers in the DC metropolitan area. GW is one of the nation's leading universities with chartered centers and institutes that provide research and innovation in science and technology, health, public policy, global security, and the arts and humanities. Research expenditures from federal sources, a key measure of an institution's research activity, increased from approximately \$92 million in fiscal year 2006 to \$235 million in fiscal year 2024.

The research activities conducted at the George Washington University (GW) has steadily increased and is widely diverse in sponsorship from federal and non-federal supported projects. The GW research enterprise has earned an R1 Carnegie Classification which demonstrates its high capacity for research and signifies a strong commitment to research and development (R&D). GW has also been inducted as a member of the Association of American Universities (AAU) a prestigious designation that highlights GW's ability to secure research funding and attract top research faculty who embark on advancing knowledge, addressing societal challenges, and influence policy. The research administration offices are the business infrastructure at GW that aims to provide experience, expertise and commitment to handle sponsored research and sponsored research agreements from inception, award management, to close-out as part of the entire GW research ecosystem.

GW sponsored projects administration for pre- and post-award support is organized through Research Support Teams (RSTs) units, and the central Office of Sponsored Projects. The RST units comprise of various schools conducting research throughout the university. Collectively, these groups manage the complete lifecycle of a sponsored research project and provide continuity of support. The Public Health and Law Research Support Team (PH&L RST) provides and manages research administration services to the Milken Institute School of Public Health (SPH), the Biostatistics Center (BSC), and the Law School (LAW). The RST management and staff are dedicated to sponsored projects administration, working collaboratively with principal investigators (PIs) to ensure research integrity and compliance that complies with federal, state, local laws, regulations, and university policies for or on behalf of GW.

The **Office of the Vice Provost for Research (OVPR)** promotes high standards of ethical research and scholarly conduct and supports activities that lead to extramural funding. The OVPR Research Enhancement Unit (REU) builds collaborative interdisciplinary research teams through assistance with proposal development for large multi-investigator program projects and center grants and develops research infrastructure by facilitating dialogue among investigators across disciplines. Educational development seminars and workshops for early-stage investigators are available through the REU. The OVPR provides faculty with guidance and training to successfully apply for research grant funding. Research salons are designed to connect and engage GW faculty from diverse disciplines in collaborative intellectual and

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scholarly exchange around research-themed issues, questions, and challenges. Pre-award grant development Boot Camp is one of those offerings presented twice annually. Under OVPR leadership and in tandem with the schools' Associate Deans for Research, OVPR's Research Enhancement provides faculty with guidance and training to successfully apply for research grant funding. Regular or research faculty and research scientists eligible to serve as PI and their graduate students may request services from Research Enhancement.

The School of Public Health and Health Services was established in 1997 and renamed the **Milken Institute School of Public Health (GWSPH)** in 2014. The GWSPH is housed in a *Leadership in Energy and Environmental Design* (LEED) platinum-certified building featuring more than 115,000 square feet of floor space for classrooms, research labs, departmental offices, and conference rooms. The school attracts top scholars and is a catalyst for the study and advancement of a wide spectrum of community, social, and scientific public health initiatives. GWSPH is committed to excellence in scholarship to advance the health of the populations of our local, national, and global communities. Our mission is to provide the best public health educational experience incorporating our core values of scholarship and leadership, scientific rigor and policy analysis, and training to foster the next generation of thought leaders, practitioners, policymakers, and scientists who will transform public health worldwide, especially for underserved and vulnerable populations. Ranked #12 in the U.S. News & World Report's list of best public health graduate programs.

In 2010, renowned epidemiologist, pediatrician, educator, and former Environmental Protection Agency (EPA) regulator Lynn R. Goldman was named Dean of GWSPH. Before joining in 2010, she was a professor of environmental health sciences at Johns Hopkins University's Bloomberg School of Public Health; and prior to that, Dr. Goldman served as Assistant Administrator for the EPA's Office of Chemical Safety and Pollution Prevention. She also worked at the California Department of Public Health, where she headed the Division of Environmental and Occupational Disease Control. A member of the National Academy of Medicine, Dean Goldman has chaired or served on numerous committees and forums, including the National Academy of Medicine Governing Council and the Governing Board of the National Academy of Sciences. She is a member of the Food and Drug Administration Science Board and the Advisory Committee to the Director of the Centers for Disease Control.

The GW School of Public Health (GWSPH) comprises seven departments: Environmental and Occupational Health, Epidemiology, Exercise and Nutrition Sciences, Global Health, Health Policy and Management, Prevention and Community Health, and Biostatistics and Bioinformatics. Each of the departments is headed by the department Chair and has administrative support by way of a Fiscal Operations Manager and/or Associate Director and a Finance team or Administrator. Each GW full-time faculty member has access to a furnished office equipped with computers, phones, and all the requisite office functionalities.

Within GWSPH, research is coordinated by the **Office of Research Excellence** (ORE), headed by the Senior Associate Dean for Research & Innovation (SADR), Adnan A. Hyder, MD, MPH, PhD. The ORE is involved in specific research support functions such as Research Integrity, Compliance and Ethics (RICE); Research Metrics, Research Communications, Research

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Training, Research Day and Administration Support. It houses research specialists in their respective domains, who are responsible for supporting departmental administrators and investigators through the various processes and stages of research. Dr. Hyder also directs GW's Public Health and Law Research Support Team (PH&L RST) that provides research administration services to GWSPH and GW School of Law.

Various research centers and programs at GWSPH focus on key areas of domestic and global health, including Antibiotic Resistance Action Center, Biostatistics Center, Center for Community Resilience, Center for Health and Health Care in Schools, Center for Risk Science and Public Health, Center for Social Well-Being and Development, DC Center for AIDS Research, DC Metro Tobacco, Research and Instructions Consortium, Food and Health Policy Institute, Geiger Gibson Program in Community Health, Gill-Lebovic Center for Community Health in the Caribbean and Latin America, GW Center of Excellence in Maternal & Child Health, Hirsh Health Law and Policy Program, Jacobs Institute of Women's Health, and the Sumner M. Redstone Global Center for Prevention and Wellness. As a multi- and transdisciplinary institution, cross-school collaborations are ongoing across our seven academic departments, extend to the rest of the campus, embodied by numerous collaborations with colleagues in GW's medical, nursing, public policy, law, business schools, arts and sciences, engineering and international affairs. The public health programs of the GWSPH has full accreditation from the Council on Education for Public Health (CEPH).

### 1.1 GWSPH Commitment to Excellence

At the Milken Institute School of Public Health, we are deeply committed to advancing public health by promoting exceptional research, comprehensive teaching methods, and establishing strong community partnerships. Our primary objective is to provide unyielding support and embrace individuals of all ages, races, colors, ethnicities, national origins, genders, sexual orientations, gender identities, religious affiliations, and various disabilities. The school diligently fosters an environment that encourages the integration of diverse perspectives within the School of Public Health, actively engages with communities, and effectively designs sustainable solutions to address health equity issues.

Our Inclusive Excellence Committee is a collaborative effort involving faculty, staff, and students. We are dedicated to fostering a community environment that encourages the exploration of creative and innovative methods for greater involvement within and beyond GWSPH. The committee serves as advocates and representatives, aiming to elevate [MORALE](#) (Motivation, Opportunity, Recognition, Appreciation, Leadership, Empowerment), well-being, and inclusivity among our colleagues. We want you to feel empowered and engaged in our community through the active role of the Inclusive Committee.

Within GWSPH, we are staunch advocates for acknowledging and celebrating inclusion as crucial elements in driving innovation and excellence in all our programs. At the same time, we remain steadfast in our pledge to promote social justice. We firmly believe that it is incumbent upon every one of us to actively contribute to creating a safer, more inclusive environment.

## 1.2 Office of Sponsored Projects (OSP)

[The Office of Sponsored Projects \(OSP\)](#) within [the Office of the Vice Provost for Research \(OVPR\)](#) supports the university's research mission by providing oversight of externally-sponsored research. OSP assists researchers with identifying appropriate funding opportunities, submitting competitive proposals and managing successful projects.

The Office of Sponsored Projects (OSP) serves as a central resource to support the research mission of the George Washington University (GW) by providing guidance and stewardship for investigators and research administrators. The [OSP team](#) works closely with investigators, research administration pods, school-based research staff and administrators across campus to ensure success and compliance throughout all phases of a sponsored project.

OSP is responsible for:

- Effective and timely handling of research proposals.
- Preparation, interpretation, negotiation and execution of agreements on behalf of GW for projects funded by federal and state agencies, foundations and other external sponsors.
- Drafting, negotiating and executing awards and subawards for collaborative research.

### 1.2.1 PI Dashboard

[The Principal Investigator \(PI\) Dashboard](#) provides access to personalized award information. The research community can use this tool to make more informed project decisions by viewing financial and human resources information about awards at summarized and detailed levels. The Office of the Vice Provost for Research has partnered with GW's Business Intelligence Services to provide principal investigators with a powerful tool for accessing clinical trial information. The tool provides information on the financial and human resources status of awards.

Benefits of PI Dashboard:

PI Dashboard is designed to reduce administrative burden, increase transparency and streamline the financial management of awards.

- View summary and detail reports, interactive visualizations and transaction details.
- User-friendly interface shows up-to-date information on a grant's expenditures including salary distributions, travel budgets and subaward details.
- Reporting is dynamic, so researchers can get a birds-eye view of their project or drill down into specific expenses.
- Information can be exported as an Excel spreadsheet.
- PI Dashboard is accessible from anywhere, via a single login.

PI Dashboard Training:

The [PI Dashboard](#) is a powerful electronic tool for managing sponsored projects. It allows you to see the latest expenditures, spending trends, labor reports, alerts, encumbrances and more, related to sponsored projects you manage or assist in managing. Requests for training on the PI Dashboard should be made to a [post-award sponsored projects administrator](#) or to [assistant director of post-award management Alma Starks](#).

OSP provides PI Dashboard training periodically throughout the year, open to all research administration staff and faculty at the university. To view a recording of the latest PI Dashboard training, [visit the OSP Education and Training SharePoint site](#) (GW login required). For upcoming trainings on this and other topics, check the Upcoming Events section of the [Resources & Training page](#).

### 1.2.2 myResearch

[myResearch](#) is GW's integrated online system for proposal development and sponsored award management. myResearch is an enhanced electronic research administration (eRA) tool, which will be GW's integrated online system for proposal development and sponsored award management. The modernization of core research infrastructure is essential to support GW's vibrant and growing research community. In response to GW's strategic initiative to enhance the research experience and feedback gathered during the faculty-led research ecosystem review, the OSP is spearheading the implementation and ongoing updates of myResearch.

### 1.2.3 The Sponsored Projects Lifecycle

Each sponsored project follows a similar course from [initial concept](#) and [development of a competitive proposal](#), to [negotiating](#) and [setting-up](#) the award in GW systems, through [management of the award](#) and [submitting final reports to the sponsor](#).



## GWSPH Facilities & Other Resources

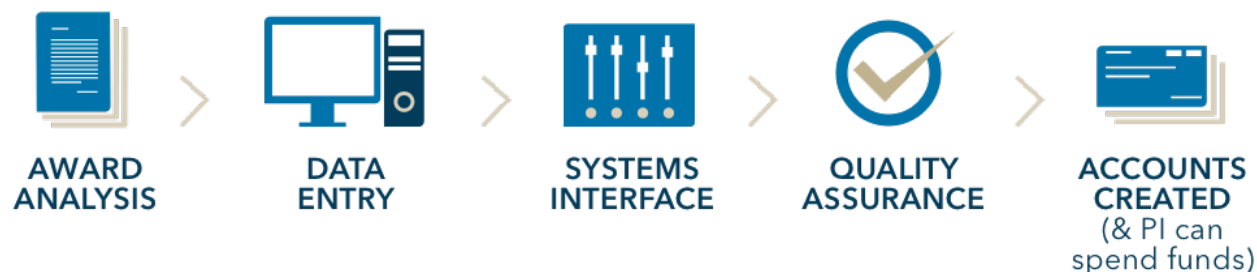
### 1. Award Administration Process

[Award administration](#) begins when the university receives notice of an award, continues through the term of the sponsored project, and culminates in the closeout of the award and submission of final reports to the sponsor. The principal investigator (PI) has primary responsibility for the financial and technical aspects of a sponsored project in accordance with relevant regulations, sponsor requirements, and university policies. Major activities that may occur during award management include expending funds, making modifications to the project budget, personnel or timeframe, monitoring financial activity, issuing project reports, and establishing and monitoring subawards.

#### Award Set-up Process

[Award set-up](#) is a process where sponsor-funded projects have financial accounts created within the university financial system, Enterprise Accounting System (EAS). EAS manages the posting of expenditures, invoicing, reporting, and tracking of sponsored funds.

Upon completion of the award negotiation and intake process, the following steps are undertaken:



- The award set-up team analyzes award documents for programmatic deliverables, invoicing requirements, financial reporting requirements and any prerequisite compliance needs. Sponsored project analysts also determine and establish the appropriate accounts.
- Data is collected and entered in the Enterprise Accounting (Oracle) and Banner systems.
- A Project/Task/Award (PTA) number and a Banner Index number are created for expense accounting and payroll labor distributions.
- The Oracle and Banner systems interface followed by a quality inspection for system functionality and compliance.
- PTA numbers are provided to PI/award manager and expenditure allocation may begin.

### 2. Award Management Process

[Award management](#) occurs after the grant, contract or cooperative agreement has been awarded to the university and the award(s) have been [set up in the Enterprise Accounting System](#). During this stage, the principal investigator (PI) is fulfilling the proposed project and overseeing financial and personnel activity, all while ensuring compliance with university and sponsor policies and procedures.

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Sound management of sponsored projects is critical to maintain the public trust in research results and outcomes. Success of a sponsored project is contingent on both the ability of the PI/project director to carry out the project and the university to ensure proper stewardship of the awarded funds. A school research administrator (SRA) within the relevant research administration pod provides support to the PI in award management activities.

### 3. Award Management Activities Process

Major activities that may occur during award management include:

- [Expending funds](#), including purchasing, managing personnel and travel.
- [Making modifications](#) to the award budget, personnel and timeframe.
- [Monitoring financial activity on the award](#), and when necessary, initiating cost transfers in a timely fashion.
- [Issuing project reports](#), including both financial and technical.

### 4. Subawards Process

When a sponsored project requires collaboration with an external investigator or entity, the establishment of a subrecipient agreement may be necessary. A [subaward](#) establishes the scope of work for these third party collaborators and establishes the responsibilities and deliverables that define success for their contribution to the overall project.

Considerations and requirements for proposing, establishing, managing and closing-out subawards parallel to those for the overall project.

Subawards can be contrasted with [subcontracts or contracts for service](#). A subcontract is a legal instrument to provide goods and or services to the university. Usually, the subcontractor provides these goods and services in their normal business operations, in a competitive environment and will not have discretion or programmatic decision making ability.

### 5. Award Closeout Process

[Award closeout](#) is the process by which the sponsor determines that all applicable administrative actions and all required work of an award have been completed (2 CFR 200.16). The closeout process varies by sponsor and by funding mechanism.

#### Award Closeout Activities

Principal investigators, school-based research administrators and staff in the Office of Sponsored Projects and Grants and Contracts Accounting Services all play a role in award closeout. Timely and accurate completion of award closeout activities will ensure compliance with university policies and federal regulations. For more information, visit <https://sponsoredprojects.gwu.edu/closeout-activities>

### Award Closeout Timeline

The award closeout timeline begins 90 days before the end of the award period and concludes 60-90 days after an award's end date. Sponsored projects are considered closed when all the work has been performed to the sponsor's satisfaction or upon the termination date specified in the award. For more information, visit <https://sponsoredprojects.gwu.edu/award-closeout-timeline>

### 1.2.4 OSP Resources and Training

The Office of Sponsored Projects (OSP) Education and Training Unit facilitates trainings that cover all stages of the sponsored projects lifecycle. The trainings are offered at various times throughout the year.

myResearch - GW's Electronic Research Administration (eRA) Tool:

myResearch is GW's integrated online system for proposal development and sponsored award management. Trainings have been developed to introduce myResearch to principal investigators, research administrators, proposal reviewers. Trainings cover all functions of myResearch, including pre-award functions, post-award functions, agreements, subawards, SF424 creation and more. Please go to the [myResearch page](#) for additional information to view upcoming training sessions and access recorded trainings and other resources.

Pre-Award Boot Camp Training:

The Pre-Award Bootcamp was most recently offered in February and March of 2024. Slides and video recordings of past sessions can be found on the [OSP Education and Training SharePoint site](#) (GW login required). The current Pre-Award Bootcamp session topics are:

- Sponsor Guidelines and Proposal Types
- Proposal Budgeting
- Compliance Overview
- Proposal Review before Routing to OSP
- The Three Cs: Communication, Coordination, and Collaboration

Award Management Boot Camp Training:

The 2024 Award Management Bootcamp is currently underway! Slides and video recordings of past sessions can be found on the [OSP Education and Training SharePoint site](#) (GW login required). Topics include an overview of sponsored projects, research integrity considerations, award modifications and prior approvals, purchasing goods, and much more. For upcoming sessions, be sure to check the Upcoming Events area above.

Proposal Budgeting Training:

Helpful tips and templates for budget planning and preparation of proposals for sponsored projects.

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### Post-Award Management Training Series:

The Post-Award Management Training Series covers topics for effective management of sponsored projects including an overview of the regulatory environment, documenting and submitting expenditures, financial monitoring and award closeout, among others. All staff who work with sponsored projects are encouraged to attend these workshops.

### Research Integrity and Compliance Training:

The Office of the Vice Provost for Research's [Office of Research Integrity and Compliance](#) and [Office of Human Research](#) offers a number of trainings (online and on-campus) for researchers, including:

- [Responsible Conduct of Research](#),
- [Human Subjects Research](#) (IRB Training Series)
- Fiscal Responsibility and Compliance
- [Export Controls](#)
- [PHS Financial Conflict of Interest](#)

### 1.3 Research Support Teams

The George Washington University (GW) utilizes a shared services model for local sponsored research administration. Research Support Teams (RSTs) provide pre- and post-award administration to one or more schools and their affiliated research centers and institutes.

The Arts and Sciences Research Support Team provides support to the following units:

- Columbian College of Arts and Sciences
- Elliott School of International Affairs
- School of Business
- Graduate School of Education and Human Development
- College of Professional Studies
- Libraries and Academic Innovation
- Non-school units

The Public Health and Law Research Support Team provides support to the following units:

- Milken Institute School of Public Health (including the Biostatistics Center)
- GW Law

The Medical Research Support Team provides support to the following units:

- School of Medicine and Health Sciences
- School of Nursing

The Engineering Research Support Team provides support to the School of Engineering and Applied Sciences

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More details on each RST, including staff portfolio assignments, can be found on the linked websites below:

- <https://sponsoredprojects.gwu.edu/affiliated-offices>
- <https://blogs.gwu.edu/pod1/>
- <https://blogs.gwu.edu/pod2/>
- <https://blogs.gwu.edu/pod3/>

Additional staff from the Office of Sponsored Projects (OSP) work closely with the RSTs to review and approve activities. These assignments can be found on the OSP website:

- <https://sponsoredprojects.gwu.edu/osp-staff-function>

### 1.4 Technology Commercialization Office

[The George Washington University's Technology Commercialization Office](#) serves as the bridge between in-house researchers and outside companies, entrepreneurs and investors. They help our experts move their inventions and ideas from the lab or classroom to the marketplace by supporting them throughout the commercialization journey. We also help companies and entrepreneurs find and access the GW technologies they need to grow their business and be successful. In this way, GW research can have an even greater impact on the world. Additionally, The Technology Commercialization Office collaborates with several university, regional and national offices and programs to provide experiential learning opportunities, foster a culture of entrepreneurship and create a thriving innovation ecosystem at GW.

The Technology Commercialization Office works closely with many units within the [Office of the Vice Provost for Research](#) (OVPR). OVPR facilitates external and internal funding processes, and provides support for research initiatives at the George Washington University (GW). Research and innovation are driving forces advancing GW as an academic institution and society as a whole, and OVPR strives to strengthen existing initiatives and expand into new multidisciplinary fields.

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## SECTION 2: Departments at Milken Institute School of Public Health

### 2.1 The Department of Environmental and Occupational Health (EOH)

Major areas of research within the [Department of Environmental and Occupational Health \(EOH\)](#) include antimicrobial resistance and food safety, chemical exposures and their health impacts, microbiology and the microbiome, air pollution, climate change, sustainable energy, worker health, risk and decision sciences, and environmental and molecular epidemiology. The

impact of the Department's research extends beyond the greater Washington, DC metropolitan area to the broader United States and globally. The EOH department is home to the Antibiotic Resistance Action Center (ARAC) and leads both the GW Climate and Health Institute (GW CHI) and the newly funded Research and Engagement for Action on Climate and Health (REACH) Center, a multi-institutional exploratory center that cultivates a diverse, multi-disciplinary, and collaborative research enterprise between George Washington University, Howard University, George Mason University, and the Environmental Defense Fund. Department faculty have received research funding from numerous agencies, including the National Institute of Environmental Health Sciences, the National Institute of Allergy and Infectious Diseases, the National Science Foundation, NASA, the Center for Disease Control and Prevention, the National Institute for Occupational Safety and Health, and the National Oceanic and Atmospheric Administration, as well as foundations (e.g., McElhattan Foundation, Wellcome Trust, Robert Wood Johnson). Faculty serve on various federal boards and advisory panels, including the National Institutes of Health, the Environmental Protection Agency, the Centers for Disease Control, and the National Academies of Science, Medicine, and Engineering.

### **2.2 The Department of Epidemiology (DEPI)**

[The Department of Epidemiology](#) supports a robust portfolio of research in the quantitative and laboratory sciences of public health. Department faculty are engaged in both infectious and non-communicable research. Methodological areas of expertise include reproductive immunology, population-based surveillance, observational and experimental designs including randomized clinical trials, training of the next generation of epidemiologic scholars, and research infrastructure grants. Department faculty lead highly impactful research awards, including the NIH-funded DC Center for AIDS Research (DC CFAR), the DC Clinical Trials Unit (DC CTU), and the DC Cohort; they also lead the DC site of the CDC-funded National HIV Behavioral Surveillance (NHBS) in partnership with the DC Department of Health, and multidisciplinary, cross-institution centers such as the GW Institute for Brain Health and Dementia. The Department's primary sources of funding include the NIH, CDC, and DC Health.

### **2.3 The Department of Exercise and Nutrition Sciences (EXNS)**

[The Department of Exercise and Nutrition Sciences \(EXNS\)](#) conducts nutrition and physical activity research that spans the basic and clinical sciences to applied community-based research and epidemiological analyses of large national and international surveillance studies. Focus areas include diet and physical activity for chronic disease prevention, school- and community-based physical activity and dietary interventions, metabolic and health effects of artificial sweeteners, dietary assessment in diverse populations, aging and physical function, obesity prevention, food access, and sustainable food systems, injury prevention and muscular adaptation to exercise. The EXNS faculty have projects funded by organizations such as the National Institutes of Health, Department of Health and Human Services, U.S. Department of Agriculture, American Heart Association, The Gates Foundation, and local and national charitable foundations.

## **2.4 The Department of Global Health (GH)**

Areas of research expertise within the [Department of Global Health \(GH\)](#) include maternal, newborn, and child health, malnutrition, infectious disease, immunology, chronic disease, environmental health, injury control, global health policy and governance of international health systems, regulatory science and policy, vaccinology, demography, health systems analysis, global health economics, program evaluation, system dynamic models for building community resilience, and humanitarian health. The department works both domestically and in multiple low- and middle-income countries around the world. Academic programs include a PhD in Global Public Health Sciences, and MPH programs in Global Health Epidemiology and Disease Control, Global Health Program Design, Monitoring and Evaluation, Global Health Policy and Systems, and Humanitarian Health. The department is home to four centers, the Summer Redstone Center for Global Health and Wellness, the Gill-Lebovic Center for Community Health in the Caribbean and Latin America, the Center for Commercial Determinants of Health, and the Center for Community Resilience. Departmental faculty have a wide range of methodological expertise including in quantitative and qualitative study designs, individual and community-based randomized trials, mixed methods, demography, health and development economics, systems dynamic modeling, performance-based health systems evaluation, and social network analysis. Faculty in the Department hold a diverse portfolio of research and technical assistance from numerous funding agencies, including the National Institutes of Health, the Centers for Disease Control and Prevention, the Bill & Melinda Gates Foundation, the American Diabetes Association, the Robert Wood Johnson Foundation, as well as other foundations.

## **2.5 The Department of Health Policy and Management (HPM)**

[The Department of Health Policy and Management \(HPM\)](#) conducts innovative and rigorous multidisciplinary research that addresses significant health challenges that are also pertinent to ongoing policy and management issues confronting the nation and the world. Health policy involves the decisions, plans, and actions undertaken by public and private organizations and governmental bodies to influence and improve individual and public health and health care through the achievement of specific goals. HPM faculty conducts research in areas, such as the impacts of changes in the Affordable Care Act, which has been influential as legislators, policy makers, healthcare providers, administrators, payers, and consumers navigate the complexities of the evolving healthcare system. Leveraging our unique location in Washington, DC, the Department faculty are often invited to work with and advise federal agencies, Congress, and the White House on public health issues. The HPM has been rated as one of the top five academic health policy and management units in the nation, according to US News and World Report. Our faculty also provide strategic and technical advice to clients to help them understand the evolving world of public health and health policy. Our major research activities include providing policymakers, public health officials, health care administrators and advocates, and the public with the information and ideas they need to improve access to high-quality affordable health care and population health. The primary source of funding is from numerous funding agencies and organizations, including the National Institutes of Health, Centers for Disease Control and Prevention, Agency for Healthcare Research and Quality, Patient-Centered Outcomes Research Institute, Centers for Medicare & Medicaid Services, Health

Resources and Services Administration, The Atlantic Philanthropies, Robert Wood Johnson Foundation, East Bay Community Foundation, Commonwealth Fund, District of Columbia Department of Health, W.K. Kellogg Foundation, Kresge Foundation, American Heart Association, Henry J. Kaiser Family Foundation, and many others.

### **2.6 The Department of Prevention and Community Health (PCH)**

[The Department of Prevention and Community Health \(PCH\)](#) conducts research to develop, implement, and evaluate innovative and theoretically based interventions to promote health and well-being. Faculty and staff work in schools, clinics, and communities to improve health outcomes and address health disparities in maternal and child health, reproductive health, mental and behavioral health, chronic disease, cancer, and infectious disease including HIV/AIDS. Departmental faculty have methodological expertise in quantitative and qualitative cross-sectional and longitudinal study designs, individual and community randomized trials, implementation science, mixed methods approaches, social epidemiology and demography. Members of the faculty are also experts in health communication, digital health technologies, social marketing and mass media. PCH faculty have extensive experience in numerous international, domestic and local contexts, designing research projects and programs that have been funded by a wide range of government funded agencies, foundations and local and state governments.

PCH has several affiliated centers including: The Center of Excellence in Maternal and Child Health; the Center for Health and Health Care in Schools; the Avance Center for the Advancement of Immigrant/Refugee Health; and the Center for Social Well-Being and Development. Faculty in PCH are also affiliated with the GW mHealth Collaborative, the Behavioral Research Insights & DiGital Health Technology (BRIGHT) Institute, the Gill-Lebovic Center for Community Health in the Caribbean and Latin America, the GW Cancer Center and the DC Center for AIDS Research.

The Department has one doctoral program in the area of Social and Behavioral Sciences and multiple master's programs through which students can focus on community health and prevention science, maternal and child health, and public health communication and marketing.

### **2.7 The Department of Biostatistics and Bioinformatics (DBB)**

[The Department of Biostatistics and Bioinformatics \(DBB\)](#) was founded in 2019 elevating the SPH's commitment to the quantitative sciences and supporting the university-wide focus on science, technology, engineering and math (STEM). The DBB's vision is to improve public health through excellence in education and teaching in biostatistics and bioinformatics, transformative scientific research, and dedicated service to the university, profession and community. With faculty that have received more research funding than any other department at the university, the Department educates the next generation of leaders in biostatistics and bioinformatics by providing opportunities for close interactions with award winning faculty and practical real-world training opportunities in clinical trials, observational studies, diagnostic studies, statistical consulting, and bioinformatics and computational biology. Academic programs include PhD, MS,

and BS programs in Health Data Science; MPH and BS/MPH programs in Biostatistics; and an undergraduate minor in Bioinformatics. DBB faculty are engaged in a diverse research portfolio that includes areas such as diabetes, infectious diseases including antibacterial resistance and COVID-19, Alzheimer's disease and mental health, maternal-fetal medicine, cardiovascular disease, emergency medicine, and oncology. Methodological interests of the faculty include the design and analyses of clinical trials, SMART trials, pragmatic trials, the desirability of outcome ranking (DOOR), and benefit: risk evaluation; causal inference; cost-effectiveness evaluation; machine learning; missing data; longitudinal data; diagnostic evaluations; functional time series; and research in educational approaches in biostatistics, bioinformatics, and health data science. Faculty from the Department provide leadership of several important research entities within the GWSPH including the renowned Biostatistics Center (BSC; [see section 2.8 below](#)), the Computational Biology Institute (CBI) and the Biostatistics and Epidemiology Consulting Service (BECS).

### 2.7.1 The Computational Biology Institute (CBI)

Located within the DBB, [the Computational Biology Institute \(CBI\)](#) brings together leading faculty in computing, health, engineering, and biology to harness vast and diverse information, opening new doors of discovery that have the potential to benefit millions of people. The CBI is also maximizing the University's unique relationships in the nation's capital to form research partnerships and spotlight cutting-edge topics that may influence future U.S. and international policymaking. By blending its own skills with the expertise of engineers, mathematicians, statisticians, clinicians and others, the CBI is contributing to knowledge and resources for use by researchers on a global scale, influencing how the world uses science and technology to solve its most pressing problems. With these truly incomparable resources and expertise, the CBI performs cutting-edge research and helps raise awareness of scientific advancements that improve our health, environment and overall quality of life. The CBI has developed a 4,000 square foot collaborative research space for interdisciplinary interactions and sharing of ideas complete with state-of-the-art technology to facilitate such collaborations all housed in the interdisciplinary Science and Engineering Hall on the GW Foggy Bottom campus. The space houses faculty, postdocs, research associates, visiting faculty, graduate students, and undergraduate researchers. Additionally, the GW Division of Information Technology staffs the CBI with a full-time HPC expert in genomics applications.

### 2.7.2 The Biostatistics and Epidemiology Consulting Service (BECS)

[The Biostatistics and Epidemiology Consulting Service \(BECS\)](#) provides biostatistical, epidemiological, and study design support for health-related research projects. The BECS addresses statistical needs of small- to medium-sized observational, epidemiological, and laboratory studies as well as small clinical trials.

The priority services of the BECS are:

- Pre-award consultation on best practices for biostatistical methods, sample size selection, and study design for health-related grant proposals,

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- Pre-award statistical analysis assistance (by faculty and/or graduate students in biostatistics and epidemiology) of preliminary data to support a grant application.
- The BECS offers BECS Quick Clinic which is a free resource for GW-based faculty, medical residents, fellows, and staff working with GW faculty to handle health-related statistical and data management inquiries with quick turnaround.

### 2.8 Biostatistics Center (BSC)

The Biostatistics Center, founded in 1972 and located in proximity to the National Institutes of Health (NIH), has a 52-year history of leadership in practice-changing clinical trials and biostatistical methodology research, and has received more than \$1 billion in NIH research grant funding. With a vision to improve public health and clinical practice by conducting transformative scientific research, research studies conducted by the Biostatistics Center have been: recognized in reports to the United States President and Congress, cited in reports from the United States White House, recognized in Time Magazine's The Year in Medicine, named the #1 advance in medicine by the Harvard Health Letter, received the Society for Clinical Trials "Trial of the Year" Award, received the Norman F. Gant Award for best research in maternal medicine, twice recognized in Clinical Research Forum's Top Ten Awards, served as the basis for the National Diabetes Prevention Program adopted by the CDC, Served as the basis for regulatory clearance of first extragenital gonorrhea and chlamydia diagnostic tests, featured in People magazine, twice recognized in "Drazen's Dozen", and resulted in more than 65 publications in the *New England Journal of Medicine*. The Biostatistics Center has independent onsite IT systems and associated staff, and onsite administrative staff dedicated to Center projects. A detailed video presentation of the Center's history including the impact of the Center's studies and methodological research, the Center's illustrious faculty and researchers, the education of students, and the career development of re-searchers can be found here: [https://biostatcenter.gwu.edu/50anniversary\\_address](https://biostatcenter.gwu.edu/50anniversary_address)

The Center has a staff of approximately 130 with more than 45 biostatisticians/epidemiologists that includes more Fellows of the Society for Clinical Trials (SCT) than any other institution. Twenty faculty members at the Center provide biostatistical leadership and manage approximately \$60 million annually for projects in medical areas such as diabetes, maternal fetal medicine, infectious disease, cardiovascular disease, and cancer. Currently, thirty employees at the Biostatistics Center are enrolled in academic programs at the GWU.

The Biostatistics Mission:

- To improve public health and clinical practice by conducting transformative scientific research.
- Provide leadership and expertise in the execution of clinical trials, observational studies, and diagnostic studies.
- Foster biostatistical science by developing and implementing innovative approaches for the design, conduct, analysis, and reporting of clinical research studies; and
- Provide training and education relevant to clinical trials and other clinical research.

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The Director of the Biostatistics Center is Dr. Scott Evans, founding Chair and Professor in the Department of Biostatistics and Bioinformatics.

More information about the Center and its 50th anniversary can be found at:

<https://gwtoday.gwu.edu/gw-biostatistics-center-marks-50-years-transformational-research>,

[https://www.sctweb.org/newsletter.cfm?pdfpass=2023\\_vol34.3\\_Mar.pdf](https://www.sctweb.org/newsletter.cfm?pdfpass=2023_vol34.3_Mar.pdf),

<https://biostatcenter.gwu.edu/>

More information about the Center Facilities and Resources can be found [here](#).

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### **SECTION 3: Physical Resources**

The school has physical resources adequate to fulfill its stated mission and goals and to support instructional schools. Physical resources include faculty and staff office space, classroom space, student shared space and laboratories, as applicable.

GWSPH occupies space in five buildings across the District of Columbia, Maryland and Virginia. The main GWSPH building is the Milken Institute School of Public Health at 950 New Hampshire Avenue NW in DC. Opened on May 15, 2014, this facility houses a variety of spaces for students, faculty and staff. The nine-story building features a number of healthy design features such as a central staircase to promote walking between floors, bike rooms, water bottle filling stations, all person restrooms, a family care room (one of the first of its kind at the university), standing desks and other furniture that meets the needs of employees and staff and a caregiver suite. The building has a platinum rating under the *Leadership in Energy and Environmental Design* (LEED) Green Building Rating System of the US Green Building Council (USGBC). Sustainable features in the building include a rain-water collection system, terracotta panels, an HVAC system with chilled beam and mass air displacement technologies, an enhanced storm water management system to reduce stormwater runoff by more than 25%, a green floor, low-flow plumbing fixtures, energy-saving lighting controls and numerous local, rapidly renewable and recycled content materials. In 2017, it won the [COTE® \(Committee on the Environment\) Top Ten award](#) from the American Institute of Architects.

Research labs and the Department of Biostatistics and Bioinformatics are housed on the seventh floor of the Science and Engineering Hall on the Foggy Bottom campus in DC. The Science and Engineering Hall stands at the intersection of the university's commitment to cross-disciplinary collaboration, investment in STEM, and research objectives. The largest academic building dedicated to the fields of science and engineering in the nation's capital meets the needs of GW's growing research portfolio and serves as a hub for discovery, providing new opportunities for cross-disciplinary collaboration. The public health floor has 15,260 square feet of lab space, a 1,700 square foot teaching lab in addition to a 1,000 Square foot multifunctional interactive 30-seat classroom, 3 conference rooms, 86 cubicles for lab researchers and post doc staff and 26 faculty offices. The labs will support the many research projects in the school including virology, environmental and occupational health, analytical chemistry, and the

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Antibiotic Research Center. In addition to specialized equipment within the large labs, there is a BSL 3 core lab on the east side and a DNA sequencing core on the southeast corner of the space. A spiral staircase links the public health floor with the School of Medicine's Cancer Center medical floor encouraging workflow between the two schools. The seventh floor also has an outdoor terrace with a green roof with capacity for 30 people that can be accessed from the West Side.

Located at 800 22nd Street NW, the eight-story building features highly specialized core lab facilities, such as a three-story high bay and a nanofabrication suite. It also includes world-class teaching spaces designed for a more hands-on approach to learning, two levels of program space and ample student lounge and study space. Event spaces include the green wall space and Lehman Auditorium.

Several GWSPH offices and research groups are housed at 2175 K Street NW on the second and fifth floors. Located across Washington Circle from the Milken Institute GWSPH building, 2175 K Street NW is a LEED Gold Certified building that has a state-of-the-art solar system that screens the existing façade and provides passive solar energy. Non-GW offices and organizations, including the US delegation of the European Union, are also located at 2175 K Street NW.

GWSPH operates several research labs and clinics. These include, but are not limited to, the Biostatistics Center is located in Rockville, Maryland, and the Public Health Research Clinic, run by the Department of Epidemiology, at 2021 L Street NW in Washington, DC.

### **3.1 Faculty Office Space**

The majority of GWSPH full-time faculty have dedicated office space in one of the GWSPH facilities. Each GW faculty member has a 10x11 sq. ft. furnished office equipped with computers, phones, and all the requisite office functionalities. For part-time and fully remote faculty, shared faculty offices are provided, along with open cubicles and shared workspaces in most buildings. Each building has security personnel in the lobby and GWorld cards must be shown and worn at all times. Public spaces are generally unlocked during normal business hours. After-hours access is available for GWorld card holders, with appropriate access. Spaces containing research or student confidential information are locked when not occupied.

### **3.2 Staff Office Space**

Staff occupy space across all GWSPH buildings with the majority being located in the Milken Institute GWSPH building and 2175 K Street NW. Physical space allocation is dependent on a variety of factors such as remote work schedule, job title and job role. Staff occupy a mixture of cubicles and enclosed offices. Shared workspaces (e.g., offices, cubicles, conference rooms and open lounges) are also available.

### **3.3 Classrooms**

Most classes are held in the Milken Institute GWSPH building's fourteen classrooms and two lecture halls. The ground floor of 950 New Hampshire Avenue NW includes a 227-seat auditorium as well as a separate convening center that allows the school to host a variety of conferences and academic events. The convening center is a multipurpose, flex space that can be used for large events or partitioned into up to four spaces for classes.

Because of the sizable growth in all of our programs, classroom spaces also utilized include those located throughout GW's Foggy Bottom campus. Following the pandemic, the GWSPH has made significant capital investments into updating the technology in all learning spaces. All academic spaces are outfitted with advanced audio-visual equipment that allows for virtual attendance/participation and lecture recording through [GW Lecture Capture](#), that create hybrid learning spaces that accommodate the current learning environments of our students. This equipment is updated to provide faculty and students with the latest classroom technology. For example, the convening center underwent audiovisual renovations to upgrade existing four-partitioned multipurpose meeting and events center spaces with various video sources and audio sources, web conferencing, and control systems. These rooms are able to function individually or in any combination depending on the position of room partitions which makes this flexible space attractive for both internal and external events that are hosted at the GWSPH due to the unique technological capabilities of the room.

Many spaces feature moveable furniture to create a flexible classroom where professors and students can customize the environment that best facilitates learning.

#### **3.3.1 Classroom Technology**

[GW Academic and Information Technology](#) supports more than 600 technology-enhanced classrooms and labs on Foggy Bottom, Mount Vernon, and Virginia Science and Technology campuses. These learning spaces are equipped with innovative technology, which enhances the teaching and learning experience at GW.

#### **3.3.2 Lecture Capture**

[GW Lecture Capture](#) is also available in select spaces. Classroom selection is available at <https://acadtech.gwu.edu/classroom-search>. They support the technological and educational needs of the faculty, staff, and students through 35 different classrooms, with seating sizes ranging from 8 to 180. They provide a multitude of services structured to support the teaching, learning, and research needs of the SMHS community. Videoconferencing, an equipment loan service, and on-site technical support are just a few of the services available.

### **3.4 Shared Student Space**

The 6th floor lounge (600C) at the Milken School of Public Health (950 New Hampshire Ave NW) has undergone a comprehensive transformation. It has been revamped into an exclusive area tailored to the needs of doctoral students (Doctoral Student Lounge in GWSPH). This

space is designed to provide doctoral students with an environment that fosters both focused studying and ample opportunities for relaxation and socialization with their fellow doctoral candidates.

Shared spaces for student meetings, study and collaboration are available in the Milken Institute GWSPH building on all nine floors. During the development of the building, GWSPH focused considerable investment in the availability, and later the decorating, of common areas and study spaces for students. Activity and breakout areas accommodate both undergraduate and graduate students. Congregating spaces contain a mix of comfortable chairs, tables, booths, bars and sofas for lounging, working and eating. Three of the upper floors have kitchens available to students with microwaves, sinks, refrigerators and vending machines dispensing health-conscious snacks. Electrical outlets are readily available as well as free WIFI. Apple desktops and printers are available for students free of charge on select floors. Over 400 lockers are available on a first-come-first-serve basis and students may bring a lock to protect their belongings. On the seventh floor, an interfaith meditation space is available for students who would like to pray or meditate in seclusion. Showers, a gender-neutral bathroom, caregiver suite and locker rooms are available in the basement, near the exercise rooms. During final exams week, the convening center on the ground floor is converted into a study hall with fidgets, snacks, water and stress-relieving entertainment for the students.

### **3.5 Meeting and Conference Facilities**

Located on the first floor of the SPH, are an auditorium (seats 2257), a convening center with four connecting rooms, and a pre-conference space for receptions. Additionally, two large lecture classrooms (seats 10,090), one executive case room (seats 75) with computer plug-in capacity and tiered audio-equipped seating, 14 classrooms (seats 20-50 each), and seven conference rooms. All of these amenities serve as a venue for continued research and collaboration with a wide variety of government and non-governmental organizations.

The University campus provides several large auditoriums, meeting rooms, and access to hotels for our school to host meetings and conferences. The GW School of Media and Public Affairs building features a 258-seat auditorium designed to attract media events and newsmaker studio for faculty members to hold media interviews. Additionally, the building is equipped with fiber optic networking, Internet access, and teleconferencing classroom. The Cloyd Heck Marvin Center is the George Washington University's campus community center, regularly used by SPH faculty and staff to host meetings.

### **3.6 Science and Engineering Hall (SEH)**

The Science and Engineering Hall (SEH) meets the needs of GW's growing research portfolio, serving as a hub for discovery and providing opportunities for cross-disciplinary collaboration. The building includes functions from the SPH, School of Medicine and Health Sciences, GW Cancer Center, the School of Engineering and Applied Science, plus the Columbian College of Arts and Sciences' physical science departments. The SPH's seventh floor contains 15,260 square feet of lab space, a 1,700 square foot teaching lab, 3 conference rooms, 86 cubicles for

lab researchers, and 26 faculty offices. The SEH building is designed with shared common areas outside all labs, banks of workstations, and a spiral staircase that links the public health floor with the medical floor to allow for workflow between both schools. The SPH labs support diverse research projects in the school including virology, bacteriology, bioinformatics, environmental and occupational health, analytical chemistry, and toxicology. Both the Computational Biology Institute (CBI) and the Antibiotic Resistance Action Center (ARAC) are located in the Science and Engineering Hall (SEH). In addition to specialized equipment within the large labs, there is a 1,200 square foot BSL-3 laboratory and a 2,200 square foot GW Genomics Core for DNA/RNA sequencing services.

### 3.7 University Campus Locations

#### 3.7.1 Foggy Bottom Campus

The 115,000 square foot **Milken Institute School of Public Health** building houses all seven departments and includes nine flexible modular classrooms equipped with technology to supplement teaching and collaboration of small groups. There are five high-capacity classrooms with digital projectors and lecture capabilities along with a single 75 seat “Case Room” with individual microphones for each seat. Two 75 seat lecture halls and one 220 seat auditorium round out the teaching facilities. The basement level houses one of two fitness testing facilities, the other being located on the Virginia Science and Technology Campus.

The **School of Medicine and Health Sciences (SMHS)** Classroom Services supports the technological and educational needs of the faculty, staff, and students through 35 different classrooms, with seating sizes ranging from 8 to 180. They provide a multitude of services structured to support the teaching, learning and research needs of the SMHS community. Videoconferencing, equipment loan service, and on-site technical support are just a few of the services available. They coordinate scheduling, AV and technical support for learning spaces.

- **Audio Conferencing** - Polycom Soundstation
- **Video Conferencing** - Polycom Realpresence, MondoPad, WebEx, Skype

The rest of the Foggy Bottom campus has 14 locations with classrooms. The number of classrooms ranges from 3 – 19, with seating capacity ranging from 15 - 293. List of equipment and software in each classroom can be found here:

- University Classroom Reservation
- SPH Classroom Reservation
- Science & Engineering Hall Classroom Reservation
- School of Medicine & Health Sciences Classroom Reservation

#### 3.7.2 Mount Vernon Campus

Mount Vernon Campus (MVC) is a self-contained extension of GW that contains 7 buildings with educational facilities and classrooms. MVC features Ames Hall, home to state-of-the-art

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teaching and learning spaces and a 125-seat lecture space. MVC also hosts Eckles Library and numerous event spaces such as Post Hall.

### 3.7.3 Virginia Science and Technology Campus

GW's Virginia Science and Technology Campus, located 25 miles from the University's Foggy Bottom location, has grown to encompass more than 122 acres and seven buildings.

Discovery Hall contains 21,000 square feet dedicated to multi-purpose classrooms, a physics SCALEUP lab, lounge, and study spaces on the first floor and three wet lab classrooms with support spaces on the second.

Enterprise Hall is a 204,000 square foot facility that houses classrooms, computer labs, and offices. The Virginia Campus Library and the Foundation Center Cooperating Collection are located on the first floor. Several University administrative offices, the Jason Project, as well as the main data center and public art galleries are available at this location.

Exploration Hall is a 77,000 square foot research and education facility that includes classrooms, offices, many research centers, laboratories, and a computer lab.

Innovation Hall is a 71,000 square foot building that houses a number of departments, including the Office of the Dean, School of Nursing, and the Computational Biology Institute. The building also has classrooms, as well as several student lounges.

The National Transportation Safety Board (NTSB) leases an 86,000 square foot facility for its investigation training facility, which includes state-of-the-art learning spaces, an outside simulation court for accident reconstructions, and other equipment used in training accident investigators. Training and conference space is available for use by public and governmental organizations.

Research Place houses GW's Finance Division, Division of Operations Finance, and the Office of Student Financial Assistance.

The Avenir Foundation Conservation and Collections Resource Center is a support facility for The Textile Museum collections, GW's fine art collection, and the Albert H. Small **Washingtonian** collection.

The Virginia Science and Technology Campus Library is a Funding Information Network (FIN) Partner of the Foundation Center, offering resources that help non-profit organizations and individuals identify sources of grants and foundation funding.

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## **SECTION 4: Laboratory Services**

GW maintains basic and applied research science labs at both the Foggy Bottom and the Virginia Science and Technology Campuses (VSTC).

### **4.1 Laboratories**

GWSPH operates a public health research enterprise on the seventh floor of Science and Engineering Hall on the Foggy Bottom campus. In addition to typical laboratory infrastructure, this enterprise includes a specially-designed insectary for malarial research; a Biosafety Level 3 laboratory - one of the few facilities in the United States that can safely work with airborne and potentially lethal infectious agents or toxins; as well as the GW Genomics Core, a full-service nextgeneration sequencing (NGS) core lab, capable of providing project planning, nucleic acid extraction, library preparation, quality control, Illumina and Oxford Nanopore Technologies sequencing, single-cell RNA sequencing, as well as other lab services upon request. The [Genomics Core](#) also offers bioinformatics consultations and analysis services in partnership with the Computational Biology Institute (CBI).

During the COVID-19 pandemic, the [Antibiotic Resistance Action Center \(ARAC\)](#), which is housed in this lab, launched a study to surveillance test GW healthcare workers to see if they had been infected or developed antibodies. They developed a [COVID-19 diagnostic test](#) which was granted emergency use authorization by the US Food and Drug Administration in August 2020. The GW Public Health Lab was the main COVID-19 test processing site for the entire GW community. The high-throughput automation infrastructure has since been absorbed into the GWSPH enterprise and is available as shared equipment for high-volume molecular testing needs.

### **4.2 Metabolism and Exercise Testing Service (METS)**

The Exercise and Nutrition Sciences Department (EXNS) at George Washington University houses [the Metabolism and Exercise Testing Service \(METS\)](#) that includes a laboratory research service center and a public testing program within the Milken Institute School of Public Health located in Washington, DC on the Foggy Bottom campus. The METS offers state-of-the-art exercise and clinical equipment for metabolic, body composition, and human performance testing and training protocols. The facility houses five individual laboratory spaces: Exercise Physiology Laboratory, Health & Human Performance Laboratory, Kinesiology & Neuromuscular Performance Laboratory, and two Body Composition & Resting Metabolism Laboratories. The METS offers fee-based research and public testing services to the GW community and the greater Washington DC metro region to fulfill its mission to cultivate and translate public health-related research initiatives in physical activity, exercise physiology, nutrition, and human performance by providing readily accessible and professional spaces for rigorous and reliable data collection.

For assessing body composition, the laboratory spaces currently contain two full-body dual energy X-ray absorptiometry devices (GE Lunar iDXA) for body composition and bone density

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measures (whole body and segmental capability); two bioelectrical impedance devices (one In-Body 770 and one In-Body 720 (multi-frequency BIA, whole body and segmental analytical capability) for body composition, body water status [total, intracellular, and extracellular] and cellular damage; one air displacement plethysmography units (Bod-Pod) for body composition, body density, and surface area assessment in both in adults; and eight Lange skinfold calipers for body composition assessment.

For assessing resting and exercise metabolism and performance, the labs contain three metabolic carts (two Cosmed Quark CPET units and one ParvoMedics unit for resting metabolism, maximal aerobic capacity, and spirometry); one Cosmed Quark CX12 12-Lead Electrocardiogram (ECG) system for stress testing and maximal cardiorespiratory testing; two Korr REEvue resting metabolic rate analyzers (oxygen-only sensing capability); four motorized treadmills (two Woodway treadmills [one w/adjustable handrails to best accommodate clinical and youth participants] and two Trackmaster motorized treadmills) for aerobic training, submaximal and maximal aerobic testing; one Woodway self-propelled treadmill for running-based anaerobic power testing, gait analysis, aerobic/anaerobic training; four upright cycle ergometers (one Velotron [electromagnetically braked], one Monark LC6 [electromagnetically braked], one Monark 939E [electromagnetically braked], and one Monark 894-E Peak Power [weight braked]) for cycling anaerobic power testing, submaximal and maximal aerobic capacity, and anaerobic/aerobic training; one Schwinn Airdyne for aerobic/anaerobic testing and training; one Monark 881E Upper Body Ergometer for upper body anaerobic power testing, submaximal and maximal aerobic capacity, and anaerobic/aerobic training; and one Concept 2 rowing ergometer for aerobic/anaerobic testing and training.

For assessing muscular strength and endurance, the labs contain two Olympic weight lifting platforms with two sets of Perform Better Olympic bumper plates for muscular strength and power testing/training integrated with two fully-equipped Sorinex squat racks w/benches for muscular strength and power testing/training; four selectorized and adjustable Sorinex cable pulley systems for muscular strength and power testing/training; one Keiser functional trainer air pressure resistance system for muscular strength and power testing/training; 4-28kg series of Perform Better kettlebells for strength and power testing/training; one Hawkin Dynamics bilateral force platform for force application, power, and symmetry analysis; various sandbag weights for strength and power testing/training; various weighted medicine balls both with and without accelerometers for strength and power testing/training; four adjustable 5-50lb Power Block dumbbells for strength and power testing/training; one Zeus isometric mid-thigh-pull-rig for strength and power testing/training; one Tendo and one RepOne linear position transducers for neuromuscular testing unit for velocity and power testing/training; two Jump Mats for vertical power testing; four Functional Movement Screen (FMS) test kits for movement quality assessment; four Motor Control Screen (MCS) kits for upper and lower body motor control assessment; two Y-Balance (YBT) kits for upper and lower body motor control, stability, and mobility assessment; one kBox for flywheel isoinertial training; one Biodex isokinetic and isometric dynamometer for muscular strength, symmetry, and joint integrity testing/training; eight Noraxon electromyography (EMG) sensors for muscle activity assessment; one OptoGait system for gait analysis; and one Zebris pressure platform for lower body pressure assessment. For other health and fitness assessments, the labs contain two phlebotomy stations; one

counter-top micro centrifuge; one normal 40 degree F refrigerator for temporary sample and analyte storage; one YSI 2300 Biochemistry Analyzer for blood glucose/lactate analysis; four portable Lactate Pro blood lactate analyzers; four portable One Touch Ultra Smart blood glucose analyzers; one portable Cardiocheck blood cholesterol analyzer; one SphygmoCor XCEL for assessing central hemodynamics and arterial stiffness, multiple automated blood pressure monitors; multiple blood pressure cuffs with assorted cuffs/stethoscopes; one automated external defibrillator (AED), two Seca platform scale-stadiometer combination units; and two wall-mounted stadiometers.

### **4.3 Molecular and Applied Physiological Sciences Laboratory**

As part of the Public Health Laboratories housed on the seventh floor of the Science and Engineering Building (SEH), **Dr. Matthew Barberio** of the Department of Exercise and Nutrition Science has a dedicated lab bench space (15 linear feet), biological safety cabinets, fume hoods, and all appropriate equipment for projects involving cell culture, nucleic acid isolation and quantification, protein isolation and quantification, and other advanced molecular techniques. The Public Health Laboratory facilities consist of 15,260 square feet of lab space, a 1,700 square foot teaching lab in addition to a 1,000 square foot multifunctional interactive 30-seat classroom, 3 conference rooms, 90 cubicles for lab researchers and post doc staff and 26 faculty offices. The floor is also home to the Computational Biology Institute (CBI). In addition to specialized equipment within the large labs, there is a 1,200 square foot BSL 3 laboratory and a DNA sequencing core. The Public Health Laboratories include a centrally located 576 sq ft freezer farm that contains 15 ultra-low temperature (ULT) freezers. All of the ULT freezers are on an EIPro central monitoring system, which measures, records, and manages temperature data for each unit. In the event of a temperature deviation, users are notified via email and text message. Temperature data can also be viewed remotely by logging into the EIPro monitoring system. In addition, the school has a CryoPro liquid nitrogen dewar, equipped with a low-level liquid alarm, which can store 875 (2 ml) vials.

### **4.4 Food and Nutrition Assessment Service (FNAS)**

FNAS provides state-of-the-art methods for dietary data collection from research participants on the second floor of GWSPH. The FNAS contains two components: 1) collection of dietary recall (in person or by telephone) data using the Nutrient Data System for Research (NDSR); and 2) nutrient analysis of food records, food frequency questionnaires, menus, and recipes. The FNAS physical space includes 2 research stations, each with a high-speed computer, monitor, keyboard, phone, headset, and desk space.

### **4.5 Exercise and Nutrition Science Academic Laboratory Suite**

The Exercise and Nutrition Sciences Department (EXNS) also houses six academic laboratories as a part of its Academic Laboratory Suite within the Milken Institute School of Public Health. The Academic Laboratory Suite includes: the Anatomy & Physiology Laboratory, Exercise Physiology Laboratory, Health & Human Performance Laboratory, Kinesiology & Neuromuscular Performance Laboratory, and two Body Composition & Resting Metabolism Laboratories. Each

laboratory space is outfitted with the latest equipment and technology to facilitate an immersive and interactive learning environment at both the undergraduate and graduate educational levels. Additionally, the Anatomy and Physiology Laboratory features an Anatomage virtual dissection table to enhance the student learning experience. For more information on all equipment featured in the EXNS laboratories, see section 4.2. The EXNS Academic Laboratory Suite is designed to facilitate experiential learning in health, exercise, nutrition, and performance to cultivate collaborative and critical thinkers through progressive, accessible, and integrative educational spaces.

### **4.6 BSL-3 Biocontainment Facility**

The BSL-3 Biocontainment Facility aims to provide solutions to intransigent and emergent disease threats through research, expertise and access to authentic pathogen infection systems for the GW community, trusted partners and countermeasures developers around the world. Their goal is a healthy world free from harmful outbreaks of infectious diseases.

The main objectives of the BSL-3 Biocontainment Facility include:

- Provide verified, reagent grade pathogens and their components for therapeutic development.
- Develop and maintain gold-standard diagnostic assays for high containment pathogens for comparison testing and regulatory package submissions.
- Use mammalian and arthropod infection models for pathogenesis- and transmission-based research.
- Train next-generation laboratorians in containment research techniques.

### **4.7 Genomics Core**

[The Genomics Core at GW](#) is a full-service Next Generation Sequencing core lab, capable of providing project planning, nucleic acid extraction, library preparation, quality control, Illumina and Oxford Nanopore Technologies sequencing, as well as other lab services upon request. We also offer bioinformatics consultations and analysis services in partnership with the GW Computational Biology Institute. Our core is equipped with an Illumina MiSeq and NextSeq 2000, an ONT MinIon, a 10x Genomics Chromium Controller, a Thermo Fisher Qubit 3.0 and two SimpliAmp thermal cyclers, a Precellys Evolution Tissue Homogenizer, a DeNovix DS-11 Fx Spectrophotometer, a Covaris M220, two Agilent Bioanalyzers and a Stratagene Mx3005p qPCR System. The core is staffed with two full-time employees for sample preparation, processing, and sequencing.

### **4.8 GWU CTU & DC CFAR Laboratory Support Services**

GWU CTU & DC CFAR Laboratory Support Services uses cutting-edge technologies to support clinical trials, research studies and community services to address the HIV and SARS-CoV-2 pandemic.

GWU CTU & DC CFAR Laboratory Support Services has several primary objectives, including clinical trial support, DC CFAR NGS Services, Consultation & NGS services for DC CFAR members, Targeted sequencing, WGS, and RNASeq.

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### **SECTION 5: Research Centers and Core Facilities at GWSPH**

The Milken Institute School of Public Health at George Washington University is widely recognized as one of the leading institutions for studying and practicing public health. It has built a strong reputation for its research, education, and community engagement excellence.

The school houses [numerous specialized institutes, centers, and programs](#) that tackle a diverse range of public health challenges.

These research-focused centers bring together interdisciplinary teams of scholars, practitioners, and students to investigate critical public health issues from multiple perspectives. Areas of emphasis include environmental health, health policy, health disparities, global health, and more. The research conducted within these centers informs policymaking, improves health service delivery, and advances scientific knowledge.

Beyond research, the Milken Institute School is also known for its excellent undergraduate, graduate, and professional educational programs. Students can access various resources to support their learning and professional development, including state-of-the-art facilities, hands-on training opportunities, and mentorship from renowned faculty.

The institution's commitment to public health practice is further demonstrated through its engagement with local, national, and global communities. Faculty, staff, and students actively participate in service projects, community outreach, and collaborative initiatives to address health inequities and promote population wellbeing.

Overall, the Milken Institute School of Public Health's multifaceted approach to research, education, and service solidifies its standing as a preeminent institution dedicated to improving health and advancing the public good.

#### **5.1 GW Chartered Centers & Institutes**

##### **5.1.1 Biostatistics Center**

[The Biostatistics Center](#) is dedicated to improving public health and clinical practices by conducting transformative scientific research. With a team of over 120 members, including more than 40 biostatisticians and epidemiologists, the center excels in designing and analyzing major clinical trials. Their research covers areas such as diabetes, maternal-fetal medicine, cardiovascular diseases, and infectious diseases with findings frequently featured

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in leading medical journals and reports to US government agencies. The center also focuses on biostatistical education and professional development.

The main objectives of the Biostatistics Center include:

- Provide leadership and expertise in the execution of clinical trials, observational studies, and diagnostic studies;
- Foster biostatistical science by developing and implementing innovative approaches for the design, conduct, analysis, and reporting of clinical research studies; and
- Provide training and education relevant to clinical trials and other clinical research.

### 5.1.2 BRIGHT Institute

[The BRIGHT Institute](#) focuses on supporting research on digital health technologies and their application to public health, promoting healthy behaviors, and preventing disease, where digital health technologies include all digital media and devices, such as the Internet, mobile phones, social media, apps, and SMS. By leveraging digital media, mobile devices, social media, and apps, the Institute supports faculty research in developing and assessing digital interventions. Their work includes behavior change campaigns, infodemiology, and evaluating the efficacy of new digital platforms. The Institute is dedicated to advancing the science of digital media for behavior change and integrating digital tools in public health initiatives.

### 5.1.3 Center for Health and Health Care in Schools

[The Center for Health and Health Care in Schools](#) is a nonpartisan center focused on enhancing health and education outcomes for children. Through policy development, applied research, and technical assistance, CHHCS collaborates with foundations, government agencies, school districts, and providers. The center supports initiatives like the DC School Behavioral Health Community of Practice, which aids the School Behavioral Health Expansion Initiative in DC's public and charter schools.

### 5.1.4 Center for Health Policy Research

[The Center for Health Policy Research](#) focuses on developing evidence-based solutions to improve health coverage, access, and care for underserved and vulnerable populations. Their work emphasizes research aimed at strengthening health coverage and access, improving health care for low-income, medically underserved and vulnerable populations and strengthening the health care safety net, reducing health disparities, upgrading health information technology, tackling complex problems that are found at the intersection of public health and health care, and bolstering the health care workforce. Their research scope spans national, state, local, and sometimes even transnational issues. The center supports policymakers through publications, presentations, and technical assistance, and provides training for new leaders in health services and public health policy.

#### 5.1.5 Center for Social Wellbeing and Development (CSWD)

[The Center for Social Wellbeing and Development \(CSWD\)](#) aims to promote the understanding and use of a specific social-ecological approach to support positive health and social outcomes to reduce vulnerability. The center addresses critical health and social issues in vulnerable communities through research, program planning, evaluation, and dissemination of best practices. It integrates efforts across sectors to tackle contributing factors and builds local capacities for sustainable programs.

The main objectives of CSWD include:

- Provide research and problem assessment
- Program and policy recommendations
- Communications for development (C4D) support
- Program evaluation tools and support
- Strategic planning

#### 5.1.6 Climate & Health Institute

[The Climate and Health Institute](#) focuses on the intersection of climate change, human health, and equity. The institute recognizes the complex and dynamic ways in which climate change impacts human health and envisions an evidence-based global response by governments and stakeholders to mitigate the climate crisis and equitably improve public health. The institute promotes cross-disciplinary research, training, and action, addressing challenges like respiratory illnesses, heat-related diseases, and food insecurity due to climate change.

The main objectives of the Climate & Health Institute include:

- Conducting policy-relevant and community-oriented research that reveals relationships between climate change, human health and equity,
- Educating and empowering the newest generation of leaders in equitably minimizing climate change and its health consequences; and
- Communicating and translating cross-disciplinary knowledge to integrate health and equity into actions to address climate change

#### 5.1.7 Computational Biology Institute

[The Computational Biology Institute](#) combines expertise in biology, medicine, and computing to harness large data volumes for solving complex biological problems. Their mission is to conduct cutting edge interdisciplinary informatics research, to enable broad educational activities in computational biology, and to provide bioinformatics services. The institute leverages unique partnerships to conduct cutting-edge research and helps raise awareness of scientific advancements that improve health, environment, and quality of life.

#### 5.1.8 The DC Metro Tobacco Research and Instruction Consortium (MeTRIC)

The DC Metro Tobacco Research and Instruction Consortium (MeTRIC) is a partnership of DC-based experts in tobacco control Researchers from three founding institutions, the George Washington University Milken Institute School of Public Health, the Schroeder Institute for Tobacco Research and Policy Studies at Legacy, and Georgetown University, are at the consortium's core. These institutions are joined by a variety of organizational and community partners. Their mission is to advance tobacco control and reduce tobacco-related health disparities in the DC metro area.

The main objectives of MeTRIC include:

- Administration. Provide leadership to advance tobacco control and reduce tobacco-related health disparities in the DC metro area
- Research. Develop community-driven multilevel intervention research that synergistically reduces tobacco use in the DC metro area, particularly vulnerable groups.
- Community Engagement. Foster collaborations across academic, clinical, and community partners to conduct locally-relevant research and translate research findings to policy.
- Training/Mentoring. To prepare the next generation of tobacco control researchers.

#### 5.1.9 Fitzhugh Mullan Institute for Health Workforce Equity

[The Fitzhugh Mullan Institute for Health Workforce Equity](#) aims to achieve a diverse health workforce that has the competencies, opportunity, and courage to ensure that all people attain their full health potential. The institute addresses health workforce challenges through data-driven analysis, policy recommendations, fellowship programs aimed at educating participants on equity and diversity in healthcare, and providing the space to mobilize and amplify leaders toward action in advancing health equity. Their work includes topics like behavioral and reproductive health, health equity, workforce resilience, and supporting a diverse and well-prepared health workforce.

#### 5.1.10 Center for Food Safety and Nutrition Security

The Center for Food Safety and Nutrition Security builds a base of evidence on policies that improve food security, encourage healthier food choices, and promote sustainable and equitable food systems.

#### 5.1.11 GW Institute for Brain Health and Dementia

[The GW Institute for Brain Health and Dementia](#) was chartered in December 2019 to bring together faculty from across GW with an interest in adult cognitive health. The institute aims to promote and support research that will meaningfully impact lives, through promotion of brain health, prevention of cognitive loss, addressing disparities in cognitive health, and improvements in the quality of life of persons living with dementia and their caregivers. The institute also mentors the next generation of researchers and collaborates with various stakeholders to improve brain health and support those affected by dementia.

## 5.2 GWSPH Centers & Institutes

### 5.2.1 Antibiotic Resistance Action Center (ARAC)

[The Antibiotic Resistance Action Center \(ARAC\)](#) at the SPH was created to preserve the effectiveness of antibiotics by engaging in research, advocacy, and science-based policy. ARAC is focused on finding solutions to antibiotic resistance. ARAC pairs original research with strategic communication and policy strategies to advance solutions to combat antibiotic resistance. The center's mission is to combat the pandemic of antibiotic-resistant pathogens through cutting-edge research, science-based policy, evidence-based practice, and strategic communications by bringing together experts in epidemiology, microbiology, policy, economics, law, and communications.

The ARAC has several key objectives, including:

- Reducing antibiotic-resistant microbes in the food supply.
- Making responsibly produced meat and poultry accessible to more people.
- Curbing unnecessary antibiotic use in people Using cutting-edge science to track.
- Antibiotic-resistant microbes and developing new tools.
- Harnessing the untapped power of the human microbiome.

ARAC collaborates with partners such as the Antibiotics Off the Menu Coalition, ARMADA, CDC, Consumer Reports, Natural Resources Defense Council, Statens Serum Institut, U.S. PIRG, the Wellcome Trust, and the Urgent Care Association. The center engages with policymakers to advocate for stricter laws and regulations to protect antibiotics from overuse. ARAC provides responsibly produced meat options to students and hospitals through the Certified Responsible Antibiotic Use (CRAU) label. Additionally, ARAC educates the public on antibiotic resistance and tracks the emergence and spread of multidrug-resistant pathogens. The center develops innovative strategies for improving antibiotic use in urgent care and telemedicine, making significant strides in combating antibiotic resistance.

### 5.2.2 Avance Center for the Advancement of Immigrant/Refugee Health

The Avance Center for the Advancement of Immigrant/Refugee Health fosters an academic-community collaboration with the Latino immigrant community of Langley Park, MD, to better understand factors contributing to racial/ethnic minority health disparities specific to this and other immigrant/refugee communities. The center aims to address disparities experienced by immigrant and refugee populations through collaborative research, development and testing of interventions, and dissemination of effective approaches.

The main objectives of the Avance Center for the Advancement of Immigrant/Refugee Health include:

- To use a holistic, multi-level, social ecological approach to assess and understand health disparity contributing factors;

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- To employ a consistent, sustainable community-participatory approach for defining and addressing health disparity conditions.

### 5.2.3 Center for Community Resilience

[The Center for Community Resilience](#) aims to inspire, support and sustain a movement that can address the root causes of childhood trauma, foster equity and build community resilience. With a focus on structural racism, they provide technical assistance, facilitation, research and data analysis, and policy guidance to help institutions, organizations, and collaboratives create measurable, lasting change by preventing and mitigating Adverse Childhood Experiences in the context of Adverse Community Environments. The Center's national network of cross-sector and cross-disciplinary partners includes academia, public education, healthcare, public health, social services, law enforcement, criminal justice, business development, housing and state, local and federal government.

### 5.2.4 Center for Risk Science and Public Health

The Center for Risk Science and Public Health brings together scholars and practitioners seeking to advance risk science and its application to policy for enhancing public health.

The Center for Risk Science and Public Health's main objective includes better analysis for better public health decisions.

### 5.2.5 Center on Commercial Determinants of Health (CCDH)

[The Center on Commercial Determinants of Health \(CCDH\)](#) is one of the first research centers in the world involved in studying and addressing the growing health burden caused by commercial determinants of health (CDoH). The center focuses on researching private sector engagement in public health as it pertains to various vulnerable populations around the world. CCDH brings a multi-disciplinary approach to not only scientific research but also advocacy, policy guidance and strengthening health systems.

The mission of CCDH is to understand, analyze and address the growing burden of mortality, morbidity, and disability from commercial determinants of health globally.

The center strives to bring a trans-disciplinary perspective, scientific rigor, and evidence informed approaches to studying the transforming role of industry in public health nationally and globally, including ethical, legal and social implications; health and development; and implications for health systems strengthening, regulatory and policy guidance.

The center will be driven with a sense of social justice and have a special focus on vulnerable populations around the world including children, adolescents, youth, women, urban slums, and the poor.

The main objectives of the CCDH include:

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- To develop theories, concepts, frameworks and methods for the study of CDoH around the world
- To conduct multi-disciplinary, rigorous scientific research on commercial determinants of health
- To support evidence-based advocacy to address commercial determinants of health
- To influence the inclusion of sound policies and regulations on CDoH globally
- To train and build capacity on research and action on commercial determinants of health globally
- To mobilize resources for a sustainable research enterprise with meaningful impact

### 5.2.6 DC Center for AIDS Research (D.C. CFAR)

[The District of Columbia Center for AIDS Research \(DC CFAR\)](#) is a consortium of over 250 HIV investigators at nine DC-based collaborating institutions and organizations: American University, Children's National, DC Health, Georgetown University, the George Washington University, Howard University, Us Helping Us, Veterans Affairs Medical Center, and Whitman-Walker. DC CFAR is a part of a network of about 20 Centers for AIDS Research (CFARs) that are funded by the National Institutes of Health (NIH) throughout the United States. The goals of the CFAR program are to promote and support HIV research and to develop the next generation of HIV researchers.

#### Administrative Core

This core provides leadership and coordination for the DC CFAR cores and scientific working groups, promotes synergies across collaborating institutions, and supports partnerships with government, community and academic collaborators. The core promotes multidisciplinary and multi-institutional science, administrative and fiscal oversight and facilitates effective communication.

#### Developmental Core

This core supports the development of the next generation HIV researchers in Washington, DC and promotes innovative, multi-institutional, and multi-disciplinary HIV scientific research. The core provides competitive pilot award funding as well as mentoring and training opportunities to early stage and new HIV investigators, with an emphasis on women and underrepresented minorities.

#### Basic Sciences Core

This core provides services and training in relevant basic sciences to DC CFAR investigators and offers virologic, immunologic, proteomics and sequencing services and training that are designed to support basic, clinical and translational research in HIV prevention, detection and treatment.

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### Clinical and Population Sciences Core

This core provides access to services, specimens and clinical data and promotes collaborations between clinical, translational and population-based investigators. Services include consultative clinical, biostatistical, and epidemiologic study design expertise as well as culturally appropriate community outreach to populations at-risk for and living with HIV.

### Social and Behavioral Sciences Core

This core facilitates the development and implementation of research related to the prevention, treatment and care of HIV that utilizes social and behavioral perspectives and that is innovative, theoretically driven, methodologically rigorous, interdisciplinary and high impact. The core encourages collaborations between social and behavioral investigators and their counterparts in clinical and basic sciences. It also emphasizes the development of strong relationships with community partners in the DC area.

### 5.2.7 Gill-Lebovic Center for Community Health in the Caribbean and Latin America

[The Gill-Lebovic Center for Community Health in the Caribbean and Latin America](#) is a novel research center dedicated to addressing health disparities and improving public health in the Caribbean and Latin America. Their mission is to generate, disseminate, and translate research evidence to influence community health in the Caribbean and Latin America.

The Gill-Lebovic Center for Community Health in the Caribbean and Latin America has several key objectives, including:

- Address gaps in evidence, knowledge, and methods in community and people-centered health policy and systems research.
- Partner with communities, national, and regional partners in conducting high-impact research on community health policy and systems.
- Provide opportunities to develop competencies for creating, disseminating, translating, and utilizing community health policy and systems research.
- Improve existing methods for conducting research on and within community health policy and systems

### 5.2.8 GW Center of Excellence in Maternal and Child Health

[The GW Center of Excellence in Maternal and Child Health](#) is one of 13 outstanding MCH programs across the country and works to ensure a strong pipeline of professional and academic talent to serve the physical and mental health needs of women, children, youth, and families. Their mission is to build the future by educating the next generation of local, national, and global public health professionals who will work to ensure that women are healthy before, during, and after pregnancy, and address the physical and mental health needs of women, children, and families across their lifespan. Located within the Department of Prevention and Community Health, their world-class faculty provides educational and research opportunities to students through their global and domestic work in areas including maternal health, women's

and adolescent health, reproductive health, obesity, mental health, and violence against women.

### 5.2.9 Jacobs Institute of Women's Health

[The Jacob Institute of Women's Health](#) works to improve women's health through research, dialogue, teaching, and information dissemination. Their mission is to identify and study all aspects of healthcare and public health, including legal and policy issues, that affect women's health at different life stages; to foster awareness of and facilitate dialogue around issues that affect women's health; and to promote interdisciplinary research, coordination, and information dissemination, including publishing the peer-reviewed journal Women's Health Issues.

### 5.2.10 Sumner M. Redstone Global Center for Prevention and Wellness

The vision of [the Sumner M. Redstone Global Center for Prevention and Wellness](#) is to see healthy and thriving communities adapting to climate-related health hazards and challenges; its mission is to promote equitable adaptation among communities most at risk from climate-related health hazards and challenges by cultivating research, education, and collaboration. The RGC aims to collaborate actively with several Centers and Institutes across GW that also work in the climate space. We all engage in evidence-based, policy-relevant, and cross-disciplinary research; offer impactful education programs to train the next generation of leaders in minimizing and adapting to climate impacts; and communicate and translate knowledge to a wide variety of stakeholders and end users. The Redstone Global Center is focused on the development and implementation of evidence-based adaptation and prevention interventions that lessen the impacts of climate-related hazards on health (communicable as well as noncommunicable diseases) among the most at risk communities, especially those at high risk of displacement and/or migration. Equitable adaptation to climate-related hazards is a particular focus within the larger goal of preventing disease and improving the health of local, national and global communities, including those facing displacement pressures and international humanitarian settings. We are also interested in research that addresses the interlinked threats to community health of climate change and health inequities and exposes systems and structures that are barriers to disease prevention and wellness amidst a changing global climate with subsequent hazards.

## **5.3 Health Programs**

### 5.3.1 Geiger Gibson Program in Community Health

[The Geiger Gibson Program in Community Health](#) shares the core mission of the nation's community health centers program: to eliminate medical underservice and disparities in population health and health care, advance health equity, and improve health and health care for all. Their signature research and policy analysis activities complement comprehensive health policy training for the School's master's and doctoral students, focused on health care access, equity and the unique role of health centers; public education and leadership training programs; and special activities including recognition of Emerging Leaders and Distinguished

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Visitors, along with the CHroniCles project, which documents the distinctive origins and living history of the community health center movement.

### 5.3.2 Hirsh Health Law and Policy Program

[The Hirsh Health Law and Policy Program](#) works to advance a greater understanding regarding how the law influences and shapes all phases of health care and public health, as well as how these changing systems affect traditional areas of the law.

The Hirsh Health Law and Policy Program has several main objectives, including:

- To advance knowledge and understanding of the impact of law on health and health care through multi-disciplinary research, translational legal analysis, and deep legal scholarship;
- To strengthen public health and health care through law-based public health practice;
- To educate students across the multiple disciplines of public health about how law shapes and influences health and health care.

## **5.4 Core, Lab Facilities and Research Service Units**

### 5.4.1 Biostatistics and Epidemiology Consulting Service (BECS)

[The Biostatistics and Epidemiology Consulting Service \(BECS\)](#) aims to increase the quantity and quality of GW-connected biomedical and public health research by providing sound statistical and study design support and to provide opportunities for biostatistics, bioinformatics, and epidemiology students to gain practical experience in statistical consulting and collaboration.

The main objectives of BECS include:

- To support biomedical and public health researchers at GW in securing research funding and to serve as collaborators and co-investigators on those projects that obtain funding;
- To provide mentored practical biostatistical consulting opportunities for GW students focusing on biostatistics, bioinformatics, and epidemiology.

### 5.4.2 District of Columbia Clinical Trials Unit (DC CTU)

[The NIH-funded District of Columbia Clinical Trials Unit \(DC CTU\)](#) is a regionally-focused CTU designed to address the HIV epidemic in the nation's capital, one of the most severely affected areas in the United States. The DC CTU unites two experienced, high-impact clinical research sites and conducts HIV prevention, treatment, and cure trials.

The main objectives of DC CTU include:

- Provide scientific leadership and administrative infrastructure to conduct high-quality HIV treatment, cure, behavioral, and biomedical studies, as well as vanguard HIV prevention studies at two established CRSs in support of NIH and network scientific agendas.

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- Implement best practices to ensure continued high recruitment and retention rates; participant safety; and laboratory, pharmacy, data, and regulatory excellence.
- Actively engage with the local community to ensure optimal enrollment of diverse participants from within and beyond clinic settings using Good Participatory Practices.
- Capitalize on resources available from DC CFAR and DC Cohort to engage senior investigators, mentor early stage investigators, and access a broad array of services to address NIH, ACTG, and HPTN scientific and programmatic

### 5.4.3 Metabolism & Exercise Testing Service Core

The Metabolism & Exercise Testing Service Core provides researchers, practitioners, and the community access to comprehensive facilities and resources in physical activity, exercise, nutrition, and body composition to facilitate evidence-based health, human performance, and behavior changes.

The Metabolism & Exercise Testing Service Core has several main objectives, including:

- Expand resource access to federal and privately funded research endeavors in health, physical activity, exercise, and nutrition
- Drive greater cross-disciplinary collaboration through accessible testing resources
- Create health awareness and data-driven behavior change across the GW community
- Strengthen our outreach and community resources to improve the health outcomes in the greater DC community
- Elevate health-related education and practical experiences for our student population

### 5.4.4 Sequencing Core Facility

[The GWSPH Next Gen Sequencing \(NGS\)](#) Core provides Illumina high-throughput sequencing on the MiSeq instruments. Additional sequencing-related services to be offered by the Core will include: initial consultation, library preparation and validation, sample QC, sequencing, data retrieval and processing. NGS applications include DNA Seq (Whole genome sequencing, exome capture and ChIP sequencing) as well as RNA Seq (Whole transcriptome with rRNA depletion and Transcriptome sequencing with polyA pull down).

### 5.4.5 Biorepository Core Facility

[The GW Biorepository](#) is accredited by the College of American Pathologists (CAP). It supports investigators in the Milken School of Public Health and the School of Medicine and Health Sciences at George Washington University. The biorepository banks a diverse range of biospecimen in a secured, temperature-monitored environment staffed by trained repository technicians and informatics specialists. The biorepository has experience in specimen processing, storage, and distribution. It is supported by several collaborative awards from the National Cancer Institute, including the AIDS and Cancer Specimen Resource and the AIDS Malignancy Consortium. The GW Biorepository also supports the GW Vaccine Research Unit, processing various sample types for Phase 1-3 clinical trials. The GW Biorepository has over 100,000 biospecimens along with clinical data. The biorepository also has several Laboratory

Information Management Systems (Freezerworks) and clinical data systems for annotating biospecimens (REDCap).

### 5.5 Shared Equipment

The availability of equipment for discovery and translational research is a hallmark of an outstanding research environment. These elements are evaluated on grant applications and are important for recruiting research-active faculty, trainees, and staff. A list of shared equipment and contacts is updated regularly. Visit <https://smhs.gwu.edu/research/research-toolbox/smhs-shared-equipment> for more information.

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## SECTION 6: Medical Health Facilities

### 6.1 Health Sciences

Uniquely positioned within the [GW School of Medicine and Health Sciences](#), the Health Sciences programs provide a training ground for the nation's experts in patient care, health care quality, medical laboratory sciences, clinical management and leadership, and numerous other disciplines. Health Sciences offers five entry-level clinical training programs (Emergency Medical Services, Medical Laboratory Sciences, Occupational Therapy, Physical Therapy, and Physician Assistant) in addition to professional programs for advanced training in a wide range of health fields including clinical research administration, regulatory affairs, clinical management and leadership, clinical and translational research, translational health sciences, biomedical informatics, integrative medicine and health, health care quality, and disaster response. The GW Physician Assistant program is ranked 5th out of more than 300 accredited programs nationally.

Health Sciences is active in continuing education and professional development activities, operates numerous military affiliated programs, and jointly operates a health sciences academy with Alexandria, VA public schools. Health Sciences is a global leader in online and blended education, with national experts in curriculum development, instructional design, and program evaluation.

### 6.2 The George Washington University Hospital

The mission of the [George Washington University Hospital](#) is to provide the highest quality healthcare, advanced technology, and world-class service to our patients in an academic medical center dedicated to education and research.

The George Washington University Hospital has approximately 395 beds, 20+ operating suites and 1 hybrid operating room along with a level III neonatal intensive care unit. The GW Hospital is accredited by The Joint Commission and licensed by the District of Columbia Regulatory

Affairs Department. In 2021 there were 18,464 admissions, 23,611 surgeries, 2558 births, 46,976 emergency room visits and 171,761 outpatient visits. More than 750 physicians cover 51 specialty and subspecialty areas. As a teaching hospital for the GW School of Medicine and Health Sciences (SMHS), physicians, medical students, and residents work together to deliver outstanding and compassionate clinical care while engaging in biomedical research that drives translation of breakthroughs to better health outcomes. GW achieved recognition as a “Best Regional Hospital” in the US News & World Report 2023-2024 ratings. This designation means that the GW University Hospital outperforms its peers in procedures and conditions that U.S. News & World Report evaluates, including risk-adjusted survival, patient experience, level of nursing care and successfully returning patients home following discharge.

### 6.3 GW Medical Faculty Associates (MFA)

[Medical Faculty Associates \(MFA\)](#) is an independent multispecialty physician group practice encompassing more than 52 medical specialties. Committed to providing comprehensive, thorough and accessible patient care, MFA physicians see patients at the main campus as well as at the George Washington University Hospital and several other area hospitals and community-based medical practices. MFA physicians serve as full-time faculty of the GW School of Medicine and Health Sciences providing mentorship and teaching to medical students, residents and fellows. The MFA faculty is extensively involved in a wide variety of research activities including NIH-, foundation- and industry-sponsored studies. Research by MFA physicians includes inpatient hospital-based studies as well as studies in the outpatient setting. These studies include investigations of new oral, parenteral agents and infusion-based agents. Among the many research activities include new treatments for cardiovascular diseases, infectious diseases including HIV infection, neurologic disorders among many others. MFA surgeons are examining new devices that improve cardiovascular, neurosurgical and orthopedic conditions. <https://www.gwdocs.com/research>, <https://smhs.gwu.edu/research>.

#### 6.3.1 Commitment to Outstanding Patient Care

[Medical Faculty Associates \(MFA\)](#) is an independent multispecialty physician group practice encompassing more than 52 medical specialties. MFA physicians serve as full-time faculty of the GW School of Medicine and Health Sciences providing mentorship and teaching to medical students, residents, and fellows.

The George Washington University Hospital (GW Hospital) continues to be a leader in providing the highest level of quality and compassionate healthcare for the D.C. Region. *U.S. News & World Report* has just released the 2023-2024 ratings and rankings, in which GW Hospital is recognized as the **Best Regional Hospital**. GW ranks 5th in the region, which includes hospitals in D.C. and parts of Maryland, Virginia, and West Virginia. GW Hospital achieved "High Performing" status in two specialty areas, Neurology/Neurosurgery, and Urology, along with receiving "High Performing" designations in 10 common procedure and condition areas. In addition, GW Hospital received the American College of Cardiology's National Cardiovascular Data Registry Chest Pain – Myocardial Infarction Registry Platinum Performance Achievement Award for 2023. **GW Hospital is the only hospital in Washington, D.C., to be recognized for**

**this service line.** Children’s National Hospital, GW Hospital’s NICU partner, was recently ranked the number two hospital in the country for neonatology by *U.S. News & World Report*. In addition to these recent *U.S. News & World Report* recognitions, GW Hospital also provides high-quality care in the region through its designation as a Level I Trauma Center and designation as a Comprehensive Stroke Center. The George Washington University Hospital was awarded a “B” in the Fall 2022 Leapfrog Hospital Safety Grade, a national distinction recognizing the hospital’s level of patient safety and quality of care. For more information, visit <https://www.gwdocs.com/research>, <https://smhs.gwu.edu/research>.

### 6.3.2 Commitment to Outstanding Education and Training

A key mission for SMHS is training the next generation of scientists and healthcare leaders. SMHS hosts more than 450 residents and fellows, more than 700 medical students, 130 physician assistant students, and 140 DPT students in our professional programs. SMHS functions as the administrative and quality control unit for ~75 IBS Ph.D. students enrolled in 5 Ph.D. programs, 65 students in Translational Health Sciences Ph.D. programs, and several master’s programs, undergraduate degree, and certificate programs.

### **6.4 Ross Hall**

Steps from the Foggy Bottom metro station, the [Walter G. Ross Hall](#) is home to the GW School of Medicine and Health Sciences. Ross Hall features classrooms, laboratory spaces, and the Himmelfarb Health Science Library. The George Washington University’s Ross Hall was constructed in 1973 and houses facilities for their medical school program, including their Clinical Learning and Simulation Skills and CSA Simulation Center on the 4th floor. The building contains laboratory classrooms, administrative support space, and the Himmelfarb Health Sciences Library.

### **6.5 Clinical Skills Assessment Simulation Center**

The 17,000 SF [Clinical Skills Assessment \(CSA\) and Simulation Center](#) renovation on the 4th floor of Ross Hall replaces an existing Simulation Center on the 6th floor. Replicating an actual healthcare setting for procedural training, the Simulation Center includes inpatient/outpatient rooms, control rooms, debriefing rooms, wet lab/dry lab, high-acuity simulation rooms utilizing electronic mannequins, reception, administrative offices, break-out space, and storage. Primary users include medical and health science students, residents, fellows, and practicing staff for educational purposes and professional development.

### **6.6 Cedar Hill**

To continue to address our commitment to the DC Metro patient catchment area, GW has broken ground on a new \$375 million, 365,000 square foot, 136-bed full-service new “Cedar Hill” GW hospital including cancer services and ambulatory pavilion in Washington, DC’s Ward 8 community. SMHS Dean Bass, along with DC Mayor Muriel Bowser, DC Council members and leaders from GW, Children’s National Hospital, and Universal Health Services anticipate the

opening of the new Cedar Hill Hospital and ambulatory pavilion in 2025. The new health complex will provide cancer services to a population facing alarming cancer health disparities.

### **6.7 LifeBridge Regional Medical Campus**

The regional campus provides GW medical students the opportunity to train in a community-focused health system with strong emphasis on primary and continuity care in a population health environment. Relationships developed during their clinical training as students may lead to continued training in LifeBridge Health graduate medical education programs or as future as LifeBridge Health physicians. LifeBridge Health receive the first cohort of third-year students in the Spring of 2023. For more information, visit <https://smhs.gwu.edu/academics/md-program/admissions/regional-medical-campus-lifebridge-health>

### **6.8 Nanofabrication and Imaging Center (GWNIC)**

The [GW Nanofabrication and Imaging Center](#) (GWNIC) is centrally located on GW's Foggy Bottom campus. GWNIC equipment and services are open to the GW community and external users. The GWNIC Nanofabrication Suite features equipment for lithography, deposition, etching, thermal processes, measurement and characterization. The Nanofabrication Suite in Science and Engineering Hall has approximately 5,000 square foot of Class 100 cleanroom, approximately 4,000 square foot microscopy suite, slab-on-grade construction to minimize vibrations, and passive and active shielding to prevent electromagnetic interference. The GWNIC Imaging Suites provide university-wide core resources for acquisition and analysis of microscopic images and data. Together, the suites feature light microscopy, confocal microscopy, transmission electron microscopy (TEM), scanning electron microscopy (SEM), focused ion beam scanning electron microscopy (FIBSEM) and infrastructure for preparation of microscopy samples utilizing the latest and most precise sectioning tools. The Imaging Suite at the Science and Engineering Hall is approximately 4,000 square feet, it adjoins an approximately 5,000 square foot Class 100 cleanroom, it features a slab-on-grade construction to minimize vibrations and has passive and active shielding to prevent electromagnetic interference. The Imaging Suite in Ross Hall is approximately 1,500 square foot and features lab bench space, biosafety hood, a microsurgery lab, a Vibratome for sectioning and a cell culture incubator.

### **6.9 Research Pathology Core Facility**

[The Research Pathology Core Laboratory](#) is a research core facility housed in the Department of Pathology, Room 124 of Ross Hall. The Pathology Core Laboratory is available to provide research services for both human and animal tissues, including tissue processing, embedding, sectioning, routine Hematoxylin and Eosin (H&E) stain, and special stains, frozen sections, optimization and performance of immunohistochemistry, and electron microscopy. Pathology consultative services are also available.

### **6.10 Flow Cytometry Core Facility**

The mission of the [SMHS Flow Cytometry Core Facility](#) is to provide researchers access to well-maintained cytometry equipment for sophisticated cell sorting and analysis experiments, as well as services in data analysis, instrument training, experimental consultation, and cytometry education. The facility aims to promote the production of accurate, reproducible cytometry data in support of the academic and research mission of the GW community.

The core facility is open to all schools and departments of the GW community, in addition to researchers from external academic, industrial, and governmental institutes. The facility provides high quality services in cell sorting and analysis, data analysis, and instrument and software training. The Core Facility maintains 4 cytometers and a workstation for data analysis.

One Cell Sorter is a 4-laser, 15-color BD influx high speed sorter and its features include a small particle detector, 4 nozzle size options-optimal for sorting a wide range of cell and particle sizes, up to 6-way sorting and a plate with Index sorting. The core also maintains a Sony SH800z Cell

Sorter in a 4 laser, 6 color configuration with 2 nozzle sizes capable of 2-way and index sorting. This instrument is also available for independent use after training. The Cell Analyzers are a 12 color BD Celesta conventional cytometer and a Cytex Aurora 25 color spectral cytometer. Both available for independent and assisted use.

The facility provides options and training for cell analysis. A site license for FlowJo or FCS Express is available which provides the convenience of data analysis from lab/personal computers. GW flow core users are allowed one registered computer per PI/lab at no charge with additional seats available for purchase.

### **6.11 Biomarker Discovery and Analysis Facility**

Services in [the Biomarker discovery and Analysis facility](#) include: 1) Quantitative PCR that allow analysis of transcripts in a 384 well platform and provide high quality cDNA from tissues; 2) In situ hybridization on cryostat sections and access to a library of probes targeted to neural development and pathological conditions. Facilities include quantitative western blotting, luminescence and fluorescence microplate assays, primary cell culture and electroporation systems and a cell culture and ES cell facility.

### **6.12 Animal Behavior Core**

The Animal Behavior Core is equipped with software to automatically record and analyze animal behavior. It allows trained users to perform various behavioral assays, including tests for motor activity (open field, ladder running), anxiety (elevated plus maze), social behavior, home cage behavior, and learning and memory (fear conditioning).

### 6.13 Bioinformatics & Biostatistics

Bioinformatics and biostatistical support are available through the [Biomedical Informatics Center](#) led by Dr. Qing Zeng PhD. Necessary statistical and computational expertise to analyze complex clinical and biological data including electronic medical records, advanced medical imaging, medical informatics, and high-throughput techniques in the -omics specialties. Please see <https://biomedinfo.smhs.gwu.edu/faculty-and-staff>. Additional core expertise is available through the Dept Genomics & Precision Medicine <https://smhs.gwu.edu/isb/core-services>, the McCormick Genomics & Proteomics Center <https://smhs.gwu.edu/mgpc/resources> and the GW Cancer Center <https://cancercenter.gwu.edu/research/shared-resources/cancer-informatics-core-pilot>

### 6.14 The McCormick Genomics and Proteomic Center (MGPC)

[The McCormick Genomic and Proteomic Center \(MGPC\)](#) is a genomic research center at the interface of computational genomics and wet laboratory within the School of Medicine and Health Sciences. The mission of MGPC is to promote and support genomic research at GWU through the discovery, generation and/or experimentally validation of new hypotheses, and unraveling key molecular events in normal and diseased cells. MGPC possesses a human data dedicated server, specifically protected for storage and analysis of human genomic datasets in compliance with the NIH requirements, and GWU IRB-approved protocols. Provides wet laboratory, proteomics and computational genomics support to GW researchers. The center's focus is to harness emerging, in-house genomic, transcriptomic, proteomic, and bioinformatics knowledge to build and test new biologically relevant hypotheses. The MGPC team has valid licenses for the following commercial software tools and databases:

- Geneious: A genome browser reference mapping and sequence assembly tool. Features include:
  - NGS Analysis and Genomics
  - Sequence and Chromatogram Analysis
  - Alignment and Tree Building
  - Molecular Cloning
  - Searching, Sharing, and Automation
- HGMD (Human Gene Mutation Database): A gold standard resource for comprehensive data on published human inherited disease mutations
- TRANSFAC (Transcription Factor Database): A tool that provides data on eukaryotic transcription factors, their experimentally-proven binding sites, consensus binding sequences, and regulated genes
- OncoPrint: Compute gene expression signatures, clusters, and gene-set modules, for extracting biological insights from the data
- MetaCore: A high-quality biological systems content in context, producing essential data and analytical tools to accelerate scientific research
- Ingenuity® Pathway Analysis (IPA®): IPA is a powerful analysis and search tool that uncovers the significance of 'omics data and identifies new targets or candidate biomarkers within the context of biological systems. IPA may be used for the analysis, integration, and

## GWSPH Facilities & Other Resources

interpretation of data derived from 'omics experiments, such as RNA-seq, small RNA-seq, microarrays including miRNA and SNP, metabolomics, and proteomics.

- OriginLab: Data analysis and graphics software to make technical charts for scientists and engineers displaying 2D and 3D plotting, statistics, curve fitting, and peak fitting

### 6.15 Cell Therapy Unit at GW

Led by Drs. Amarendra Neppali MD and Eric Yvon MD, the [GW Cell Therapy Unit](#) in Ross Hall provides centralized facility and resources for the preparation of therapeutic cellular products. This facility opened in 2023 and provides a centralized facility and resources for the preparation of therapeutic cellular products. Services include Hematopoietic Progenitor Cells (HPC) processing, CAR-expressing NK- and T-cell preparation, Antigen-specific cytotoxic T lymphocyte (CTL) generation, Regulatory T-cell (Treg) expansion, and Clinical grade vector production. The facility is Foundation for the Accreditation of Cellular Therapy (FACT) accredited for processing of minimal and more-than-minimal manipulation products.

### 6.16 Office of Clinical Research

[The Office of Clinical Research Office \(OCR\)](#) of the GW School of Medicine and Health Sciences unifies clinical research operations for the clinical faculty practice to support research growth, streamline operations and ensure regulatory compliance, as well as to assure its practices conform with GW requirements and processes. The OCR maintains responsibility for all aspects of administration and oversight of industry-designed, industry-sponsored multi-center clinical trials including contract negotiation, financial management, conduct and compliance functions. The OCR also provides education and mentoring for staff and faculty.

OCR provides high-quality support for the efficient execution and management of impactful clinical research while ensuring the highest level of research participant safety. OCR provides investigators with access to highly trained study coordinators, biostatistics consultation, grants and contracts and regulatory elements. A series of Bootcamps (PI Responsibilities and Study Frameworks; Study Team, Budgeting & Contracts; Participant Recruiting, IRBs and Consent; Mastering Event Reporting) that featured resources and personnel at each site. We invest in software programs and standard operating procedures to streamline CTR (i.e., OnCore, Forte, Protocol Builder, ACRP training, etc.). Consultation biostatistics support is available to advise on study design, data analysis plans, and sample size considerations during a study's planning phase. Additional support for study operations and regulatory support, as well as statistical data analysis and results interpretation to address research questions. This centralized office serves as a resource for faculty and staff involved in clinical and translational research.

### 6.17 Workforce Development

[The Office of Research Workforce Development](#) enhances research professional skill development at all career levels, including undergraduate, medical student, postdoctoral fellow, and faculty. A searchable database of research faculty, blog and funding announcements for faculty, graduate students and postdoctoral trainees was created. Assist in development of NIH

F, K, T and related mentored training activities and applications. Produces researcher onboarding and scientific and professional development workshops, grant-writing courses.

### **6.18 PhD in Translational Health Sciences**

[The PhD in Translational Health Sciences \(THS\) program](#) is unique among translation science doctorates, focusing on training students to conduct research that informs and promotes the movement of knowledge across clinical research, implementation, public health, and policy domains. This program prepares early career researchers and professionals to take leadership roles as change agents in rapidly evolving health care environments. Students develop expertise in complexity theory, organizational analysis, mixed methods research design, program theory and evaluation. The PhD in THS is a blended, low-residency program, meaning the program of study combines two formats: online and in-person learning activities. These formats are highly integrated, and each is essential to achieving student learning goals. This low-residency program uses a purposeful approach to blend technology, media, human interactions, and conventional instruction methods, which are chosen for their pedagogical value and integrated seamlessly so that all components of the curriculum form a cohesive learning experience. This mix of in-person and online learning strategies is designed to encourage students to continuously reflect, apply, and interact with others in a process of self-regulated learning. The program of study is structured so that students interact online with course materials, instructors, and each other throughout the semester and also benefiting from two on-campus weekends at VTSC two weekends each semester. During in-person weekends, students participate in collaborative, interactive workshops that integrate material across courses. Following five semesters of didactic coursework, students' complete comprehensive exams, a semester of dissertation proposal preparation, and continuous team science-based mentoring until defense of the doctoral dissertation.

### **6.19 Integrated Biomedical Sciences (IBS)**

The five biomedical science PhD programs in the GW School of Medicine and Health Sciences stem from the [Integrated Biomedical Sciences \(IBS\)](#) program. This interdisciplinary umbrella admissions and oversight program brings together a wealth of research opportunities at the GW School of Medicine & Health Sciences, the Columbian College of Arts & Sciences and the Children's National Hospital Health System. The common IBS core curriculum includes interdisciplinary cell and molecular biology and physiology courses, biostatistics, and professional skill courses in scientific writing, biomedical careers and responsible conduct. Foundation courses in each PhD program begin in the second semester, and still allow student flexibility. Students participate in three rotations in the first year of graduate training in order to identify a faculty research advisor. NIH T32 training grants support PhD training in Cancer Biology or HIV Persistence. Program-specific graduate program directors guide and oversee students through completion of remaining coursework, a grant-style qualifier examination, and dissertation research. Over 75 faculty members participate in one or more of the 5 PhD programs, and our current student enrollment numbers approximately 70. PhD alumni go on to research careers in academia, industry/biotech and government/nonprofit, as well as careers in science communication, science teaching and science policy.

## 6.20 International Medicine Programs

For over 29 years, the Office of [International Medicine Programs \(IMP\)](#) at the George Washington University (GW) School of Medicine and Health Sciences (SMHS) has cultivated global partnerships to create transformational mutual exchange in medical education, training, and research. IMP's goal is to provide life-changing opportunities to build the healthcare capacity of other countries and share the latest advances in medicine and healthcare. As a pioneer in international medical education, training, and research, IMP has developed, coordinated, and completed over 150 projects in over 50 countries, touching the lives of more than 15,000 healthcare professionals, students, and patients around the globe. IMP promotes international research partnerships by convening SMHS and international researchers at scientific summits, where they can share the latest advances in their fields and identify opportunities for collaboration. In addition, IMP partners with GW faculty to design and implement medical and research training programs both at GW and abroad. IMP further serves the SMHS community by facilitating strategic international partnerships, providing safety and security resources for SMHS faculty and student travelers, and supporting incoming international students and visiting scholars.

## 6.21 The IMPACT Initiative and SMART Lab

The [IMPACT Initiative](#) and SMART Lab (Supported Media for Administration, Research, and Teaching) provide assistance in curriculum and course design; eLearning design and development; and the creation of media such as videos, podcasts, and graphics. The team provides hardware, software, and personal assistance to support faculty in their curricular and research endeavors to offer modern instructional methods and state-of-the-art learning experiences.

## 6.22 Electronic Health Records and Research

Researchers can access electronic medical records for secure studies. Researchers typically need an IRB, work with data analyst support, and secure storage space and tools. Both GW Hospital and CNH use Cerner as their electronic health record. For Cerner support at GW UH, please contact Nathan Bible. The MFA uses Epic. For Epic support, please contact Brian Choi, Chief Medical Information Officer, or Liz Owens, Analytics Manager, and request training on a self-service tool, **Slicer-Dicer**. Faculty at the VA use VINCI as the electronic health record. For more information, visit <https://guides.himmelfarb.gwu.edu/HIT/EHR>

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## SECTION 7: Clinical and Translational Resources at Children's National

[The CTSI-CN](#) is a partnership between Children's National Medical Center / Children's National Hospital and GW to accelerate the translation of research and dialogue into improved child, family, and community health by fostering collaborative investigations.

## GWSPH Facilities & Other Resources

CTSI-CN provides members with access to:

- a. Education opportunities such as career development support, training opportunities, seminars, and symposia.
- b. Research resources that include free consultations for CTSI-CN services, reduced rates for NIH- sponsored and pilot research support, and letters of support for grant applications.
- c. Collaboration opportunities to participate in interdisciplinary research and exposure to national opportunities available through CTSA institutions.
- d. Funding for pilot award recipients and KL2 Scholars.
- e. Membership of the Society for Clinical and Translational Science.

Information about current research, upcoming events, and grant opportunities through weekly e-digests and quarterly newsletters.

### **7.1 Cellular Therapy Laboratory (CTL) at Children's National**

The [Cellular Therapy Laboratory \(CTL\)](#) is a Food and Drug Administration (FDA)-registered current Good Manufacturing Practices (GMP) facility charged with translating and manufacturing cell therapy products for use in clinical trials and stem cell transplantation. The facility is Foundation for the Accreditation of Cellular Therapy (FACT) accredited for processing of minimal and more-than-minimal manipulation products. It has expertise manufacturing a broad array of cell therapy products, including dendritic cells, T cells, cell lines, monocytes, mesenchymal stromal cells (MSCs) and genetically modified cells. In addition to manufacturing the cells, the CTL supports quality assurance and quality control functions as required by the FDA, and has a quality program that details the process by which new cell therapy protocols are transferred to the CTL, including validations, process development, training, audits, documentation, product release, and also budget creation.

### **7.2 Bioinformatics Unit at Children's National**

The Genomics Core partners with the Bioinformatics Unit through the [Clinical and Translational Science Institute at Children's National](#). The CTSI-CN CRI Bioinformatics Unit (CBU) provides bioinformatics consultation and analytical services in an initiative sponsored by The Center for Genetic Medicine Research, the Center for Translational Science, the Clinical and Translational Institute at Children's National (CTSI-CN), the District of Columbia Intellectual and Developmental Disabilities Research Center (DC-IDDRC) and the Chief Research Officer's office. The CBU works closely with researchers to design and structure their studies with the applicable bioinformatics support from the very beginning of a project. CBU assist in the following types of Study Consultation and Experimental Design: mRNA/miRNA Sequencing, Exome Sequencing, Whole Genome Sequencing, Microarray, Metagenomics/Microbiome Sequencing, ChIP Sequencing, Single Cell Sequencing and other customized sequencing. The CBU performs genomic data analysis with standard as well as custom pipelines according to specific requirements of a project. CBU also actively participates in training the next generation of biomedical researchers with the goal of enabling quality research and education. The bioinformatics Data Analysis services provided by CBU are De Novo Assembly, Single

Nucleotide Variation Detection, Copy Number Variation, Structural Variant Detection, Fusion Analysis, Differential Gene Expression, Pathway Analysis and other customized analysis.

The McCormick Genomics and Proteomic Center (MGPC) provides wet laboratory, proteomics and computational genomics support to GW researchers. The center's focus is to harness emerging, in-house genomic, transcriptomic, proteomic, and bioinformatics knowledge to build and test new biologically relevant hypothesis.

### 7.3 Genomics and Proteomics Core Resources at CNH

[The Genomics and Proteomics Core at CNH](#) is housed in open laboratories totaling 22,000 sq. ft. of space. Specialized equipment dedicated to core proteomic facilities includes:

- **Thermo Q Exactive HF mass spectrometer for LC-MS and LC-MS/MS analysis.** This mass spectrometer is a quadrupole-orbitrap hybrid similar to our Q Exactive instrument but with an improved high-field orbitrap mass analyzer. The QE-HF is coupled online to a nano-flow EasynLC UPLC system.
- **Thermo Q Exactive mass spectrometer for LC-MS and LC-MS/MS analysis.** This mass spectrometer is a quadrupole-orbitrap hybrid that can acquire spectra at 12 Hz and 140,000 resolution. This system offers state-of-the-art speed, sensitivity, dynamic range, and resolution and is ideally suited for discovery and targeted proteomic applications. It is coupled online to a nano-flow EasynLC UPLC system.
- **Thermo LTQ-Orbitrap XL mass spectrometer for LC-MS and LC-MS/MS analysis.** This mass spectrometer has up to 60,000 resolution and 3 ppm accuracy and is coupled online to an Eksigent nano-hplc. The high resolution and fast scan speeds are ideal for protein identification and quantitation.
- **ABI 4700 MALDI-TOF-TOF mass spectrometer with an Nd:YAG laser** that can operate at 355 nm to ionize samples with pulses of 3 to 7 nsec. duration and frequency of 200 Hz resulting in high-speed analysis (1000 MS and MS/MS analysis per hour). Some other characteristics of the instruments are 10 to 15,000 resolution in reflection mode, up to 10 ppm accuracy and sensitivity in the subfmole range. GPS explorer software employing a web-based protein database and Mascot search engine is interfaced to the instrument for data analysis and protein identification.

The core is fully equipped to offer both Affymetrix and Illumina array services, utilizing their complete line of arrays (DNA /RNA/miRNA). The center houses two complete Affymetrix GeneChip® stations, including two GeneChip® Fluidics Stations, two GeneArray® scanners, and two GeneChip® hybridization ovens, in a dedicated room.

The core has an Illumina NextSeq500 next-generation sequencer (NGS). Related equipment includes a Covaris DNA shearing station, and Blue Pippin and Pippin Pulse (Sage Technologies) instruments for nucleic acid sizing. A ThunderBolts RainDrop NGS target enrichment and RainDrop Sense™ (RainDance Technologies) system is also available for generating NGS libraries and digital droplet PCR. An AutoGen QuickGene-810 system is available for automated extraction of DNA and RNA from a variety of tissues.

For direct digital counting of miRNA/mRNA and selected DNA applications, we also have access to a complete NanoString nCounter System, provided by agreement with the clinical pathology department. The core is also equipped with a MesoScale Diagnostics QuickPlex SQ 120 scanner for multiplex ELISA assays over a wide dynamic range.

Computational resources are continuously upgraded. Physical servers are virtualized to save energy, enabling robust internal cloud computing. This system accommodates most standard usage and in addition allows very active users to purchase their own blades for enhanced computational power as needed. For very data-intensive sequencing experiments, we also have individual accounts within the GWU super-cluster, Colonial One.

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## SECTION 8: GW Cancer Center

### 8.1 Cancer Center

GW demonstrated a strong commitment to cancer research with the establishment of the [George Washington Cancer Center \(GWCC\)](#) in late 2015. Since that time, the GWCC has grown to a membership of over 175 investigators and built several shared resources such as flow cytometry, small animal imaging, and cancer epidemiology that support our work. The GWCC brings together investigators focused on cancer research, clinical cancer care, cancer prevention and control, and community outreach and engagement across GW, GW University Hospital, the GW Medical Faculty Associates, the Milken Institute School of Public Health, Children's National Hospital and affiliated health systems to offer a range of exciting research programs, seminars, and annual retreats. In 2022, the GWCC recruited Julie Bauman MD, MPH as Director of the GWCC. The GWCC is in an intensive growth phase expanding cancer research across clinical, basic, and population sciences to seek NCI designation within 3-5 years. The mission of the GWCC is to drive transformational research, personalized therapy, family-centered care, and cancer policy in the nation's capital.

**GW Cancer Data Visualizer** <https://cancercenter.gwu.edu/cancer-data-visualizer>. This interactive shared resource web tool allows users to evaluate cancer-related data in the District of Columbia and surrounding counties in Maryland and Virginia along with data on social determinants of health (SDH) in our surrounding patient catchment area. Data presented in the DC Cancer Data Visualizer come from publicly available, de-identified data sets including: **Cancer incidence and mortality** data from the *CDC* and *DC Cancer Registry and Population demographics* from the US Census Bureau's *American Community Survey*; Health behavior data from the DC Behavioral Risk Factor Surveillance Survey; Data on healthcare organizations, transportation, and other SDH in the community from Open Data DC and Data.gov; Environmental exposure data from the US Environmental Protection Agency, such as data available through the EnviroAtlas.

## Cancer Clinical Trials Office

[The Clinical Trials Office \(CTO\)](#) of the George Washington Cancer Center (GWCC) assists with the planning, conduct and compliance of any cancer-related clinical trials, including those using pharmacologic or radiation therapies or investigational devices, as well as non-interventional trials. The CTO is overseen by an Associate Center Director of Clinical Investigations and a Senior Administrative Director, and is staffed by nurses, regulatory personnel, data managers and study coordinators. The CTO can provide protocol support regarding scientific review, HIPAA compliance, Human Subjects protection and IRB requirements and submissions, as well as ongoing regulatory and reporting requirements. The CTO can also assist in the design, implementation and execution of investigator-initiated clinical trials and correlative studies, including blood collection and processing and tissue procurement. A state-of-the-art software package for protocol and data management is being implemented.

The Cancer Informatics Core pilot project (CIC-p) provides collaborative informatics support for cancer research, through guidance for software use and by acting as liaison for various NGS data services.

MGPC provides a rigorous, collaborative research environment that can be harnessed by the research community at GW to expand the horizons of genomic and proteomic knowledge, to open new avenues in basic and translational cancer research, and to train the next generation of bright minds in cancer genome research.

The MGPC team has valid licenses for the following commercial software tools and databases:

1. Geneious: A genome browser reference mapping and sequence assembly tool. Features include:
  - a. NGS Analysis and Genomics
  - b. Sequence and Chromatogram Analysis
  - c. Alignment and Tree Building
  - d. Molecular Cloning
  - e. Searching, Sharing, and Automation
2. HGMD (Human Gene Mutation Database): A gold standard resource for comprehensive data on published human inherited disease mutations.
3. TRANSFAC (Transcription Factor Database): A tool that provides data on eukaryotic transcription factors, their experimentally proven binding sites, consensus binding sequences and regulated genes.
4. Oncomine: Compute gene expression signatures, clusters, and gene-set modules, for extracting biological insights from the data.
5. MetaCore: A high quality biological systems content in context, producing essential data and analytical tools to accelerate scientific research.
6. Ingenuity® Pathway Analysis (IPA®): IPA is a powerful analysis and search tool that uncovers the significance of 'omics data and identifies new targets or candidate biomarkers within the context of biological systems. IPA may be used for the analysis, integration, and

interpretation of data derived from 'omics experiments, such as RNA-seq, small RNA-seq, microarrays including miRNA and SNP, metabolomics, and proteomics.

7. OriginLab: Data analysis and graphics software to make technical charts for scientists and engineers displaying 2D and 3D pl.

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## **SECTION 9: Library Facilities**

GW's extensive library collections are housed in the Melvin Gelman Library, the general academic library, the Jacob Burns Law Library, Eckles Library, Paul Himmelfarb Health Sciences Library, and the Virginia Sciences and Technology Libraries. These collections contain over two million volumes and over 20,000 serials and provide an extensive collection of general and specific volumes, periodicals, and papers in health services administration, health policy, business, medical care, economics, operations research, law, human resources management, statistics, and basic sciences. All are important to the SPH and are readily accessible to students and faculty.

### **9.1 The Himmelfarb Health Sciences Library**

[The Himmelfarb Health Sciences Library](#), the primary library for the SPH, is located in Ross Hall on the Foggy Bottom campus one block from the SPH building and also serves the School of Medicine and Health Sciences and the School of Nursing. The library currently provides electronic access to over 3,500 textbooks, 4,000 journals, 115 databases and a collection of streaming videos. Himmelfarb provides extensive on-site access to online, print and audiovisual collections, as well as access to computers and study areas. Himmelfarb Library's print collection includes approximately 100,000 volumes and access to extensive journal backfiles. Over the years, monographic holdings in public health subject areas were extensively reviewed and expanded. The Library's Bloedorn Technology houses more than 400 current DVD and CD titles as well as applications software for word processing, publishing, spreadsheets, databases, and reference management and dozens of specialized software titles focused on medicine, the health sciences, public health, and statistical analysis.

Key health sciences databases include Scopus, MEDLINE/PubMed, Health Policy Reference Center, and CINAHL Complete. Students also have access to Covidence for systematic reviews management, and major interdisciplinary databases such as Academic Search Complete, ABI/INFORM Complete Plus, Business Source Ultimate, and ERIC. Himmelfarb Library provides access to electronic journals directly from publishers and through vendors such as EBSCOhost, ProQuest, ClinicalKey, Ovid, LexisNexis, and ScienceDirect. Himmelfarb Library's collections are extended by interlibrary loan service, as well as the Consortium Loan Service which allows users to borrow from most academic libraries in the DC metro area via 2-day delivery.

## GWSPH Facilities & Other Resources

Himmelfarb Library's Bloedorn Technology Center provides access to streaming videos, DVD and CD titles, anatomical models, 3D and Virtual Reality applications, and applications software for word processing, publishing, spreadsheets, databases, and reference management and specialized software focused on medicine, the health sciences, public health, and statistical analysis. The Bloedorn Technology center also lends media equipment.

### 9.2 Estelle and Melvin Gelman Library

[The Estelle and Melvin Gelman Library](#) is the university's largest library, featuring more than two million volumes and over 300 electronic databases. Its eight levels include high-technology classrooms, computer labs, and rotating exhibitions. Staff are available to work with you to support your teaching and research at the university. Services offered include classroom support through library instruction and reserves, research & tenure support, data management guidance, interlibrary borrowing and delivery services, and media. A fuller listing of the services available can be found here: <http://libguides.gwu.edu/facultyresources>.

### 9.3 Eckles Library

The [Eckles Library](#) houses a print collection of more than 64,000 volumes covering political science, women's history and contemporary issues, interior design, history, and literature, among other subjects. Featuring student artwork and exhibits, free DVD rentals, and coffee, the library is an integral part of student life on the Mount Vernon Campus, which is accessible by free shuttle from the Foggy Bottom campus.

### 9.4 Virginia Science and Technology Campus Library

[The Virginia Science and Technology Campus Library](#) is part of the George Washington University Libraries, which is comprised of two other libraries, the Estelle and Melvin Gelman Library on Foggy Bottom and the Eckles Library at the Mount Vernon Campus.

### 9.5 GW Libraries and Academic Innovation

[GW Libraries and Academic Innovation \(GWLAI\)](#) enriches the academic experience of scholars and spurs innovation at GW through excellence in library services and research collections, support for teaching and learning, and targeted integration of the latest online and classroom technologies. Vast amounts of information are available to students, faculty, and researchers from almost any location, opening the way for streamlined scholarship and providing powerful tools for understanding and solving the complex problems of our time.

#### 9.5.1 Research and User Services

[The Research and User Services](#) department in Libraries and Academic Innovation offers a comprehensive range of services designed to meet the diverse needs of students, faculty, and researchers.

Research and User Services works in collaboration with the Himmelfarb Health Sciences Library to supplement and enhance the specialized services and resources they provide. While Himmelfarb focuses on the core medical and health sciences resources, GWU Libraries extend

this support by offering additional access to interdisciplinary databases and a broader range of academic resources. This partnership ensures that the public health community has comprehensive coverage across both specialized and general information needs.

Research and User Services provides expert research assistance, including one-on-one consultations, tailored workshops, and specialized instruction sessions. We also provide guidance on data management, citation tools, and open access publishing to ensure that your research is well-supported from inception to publication.

### 9.5.2 Support Student Learning and Research

GWLAI equips students with the tools and techniques they need to be successful. To fully serve students, we must create the best possible environment for learning and research. Library technology and resources—including expert librarians who help patrons navigate through digital and analog worlds and serve as catalysts for uncovering knowledge—are essential to the academic process.

Specialized service areas at Gelman Library that support student learning and research include:

#### **Academic Commons**

Academic Commons is GW's one-stop shop for student academic support. Academic Commons partners with instructors to provide free tutoring and review sessions for undergraduate courses. They also provide personalized assistance with statistical analyses in R, Python, SPSS, and more.

#### **CREATE Digital Studio**

The CREATE digital studio, located on the first floor of Gelman Library, assists students, faculty, and staff with the tools and expertise to expand their ability to create high-quality videos, podcasts, interactive experiences, and data visualization. CREATE is open and available to everyone at GW - regardless of major or department. Professional staff provide workshops and individual consultations to help everyone at GW use digital storytelling to effectively communicate their research and ideas in the online world.

#### **Center for Undergraduate Fellowships and Research**

The Center for Undergraduate Fellowships and Research provides individualized and group mentorship to all GW students and alumni pursuing national awards, fellowships, and undergraduate research opportunities.

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## **SECTION 10: Research Integrity, Compliance and Ethics (RICE)**

### **10.1 Responsible Conduct of Research**

At the George Washington University (GW), we are committed to fostering a research environment that is guided by the highest standards of research ethics and integrity. Conducting research responsibly is crucial to producing objective and unbiased results and maintaining the public's trust as stewards of research funds.

GW encourages all of its faculty and students to be familiar with professional and ethical standards in academic research in general as well as in their chosen fields. Ongoing Responsible Conduct of Research (RCR) training is a critical part of these efforts. RCR training provides researchers with the tools they need to make ethical decisions and is also required by many federal research sponsors.

website, <https://researchintegrity.gwu.edu/responsible-conduct-research>.

#### 10.1.1 Responsible Conduct of Research Training

Faculty and students engaged in [certain sponsored or academic research programs](#) are required to participate in RCR training. Discussion of the issues raised by this training is an important element of professional development.

RCR topics include:

- Animal Research
- Collaborative Science
- Human Subjects Research
- Intellectual Property and Commercialization
- Peer Review
- Responsible Publication, Authorship, and Copyright
- The Mentor-Mentee Relationship
- Data Management
- Research Misconduct
- Conflicts of Interests
- Reproducibility and Replicability
- The Scientist as a Responsible Member of Society

#### 10.1.2 NSF and NIH Training Plans

Certain individuals supported on National Science Foundation (NSF) and National Institutes of Health awards must complete RCR training:

- National Science Foundation (NSF) - Mandatory for all undergraduate and graduate students, and postdocs supported on any NSF award.

## GWSPH Facilities & Other Resources

- National Institutes of Health (NIH) - Students, faculty and other researchers supported on certain NIH training, career development, research education, and dissertation research grants are required to complete RCR training.

[Read more about NSF and NIH training plans](#) including who is covered and how to complete required RCR training.

### 10.1.3 GW Policies and Standards

GW has multiple policies and standards related to RCR topics:

- [Policy and Procedures Regarding Allegations of Research Misconduct](#), which sets forth our responsibilities for avoiding and reporting instances of research misconduct.
- [Conflict of Interest and Commitment for Faculty and Investigators](#)
- [Data Management and Protection Standard](#)

Please note that GW also has policies regarding compliance, ethical responsibilities in conducting research, and required training for [human subjects protection](#), [animal protection](#), and [protection of health and laboratory safety](#) when working with hazardous materials.

For a list of GW polices including those focused on RCR, please see [GW's Policies](#).

### 10.1.4 Writing Resources

GW offers resources to assist students in being responsible writers. [GW's Code of Academic Integrity](#) administered by the Office of Academic Integrity represents our community's commitment to academic honesty. The office is available to consult on issues of academic integrity.

- [RefWorks](#) is an online tool supported by Gelman Library that helps writers organize their research and create bibliographies—and avoid inadvertent plagiarism in the process.
- The [WID Studio](#) offers a range of resources and references on writing, including guidance on avoiding plagiarism and other forms of academic dishonesty.

### 10.1.5 Research Administration Trainings

The Office of Sponsored Projects in the Office of the Vice President for Research conducts periodic training sessions on research administration. For a list of upcoming events please go to the [OSP website](#).

## **10.2 Office of Research Safety (ORS)**

[The Office of Research Safety](#) is a service organization within OVPR responsible for regulatory and compliance oversight of all research conducted in GW that involves animals, biological materials, radiation and lasers. The ORS assists in protecting faculty, staff, students, animals, the community and the environment by addressing the safe handling and containment of infectious microorganisms and hazardous biological materials, lasers and radioactive materials.

The ORS is in charge of the Institutional Animal Care and Use Committee (IACUC), Institutional Biosafety Committee (IBC) and the Radiation Safety Committee (RSC). ORS provides administrative support to the IACUC, sharing responsibility for ensuring compliance with all applicable regulations, that the use of animals in research projects are necessary and that alternatives to the use of live animals have been considered. ORS and its IACUC specialist works closely with the Office of Animal Research (OAR) to support the highest standards of humane care and use of laboratory animals for research and teaching purposes and assures compliance with university and federal guidelines. The IBC is responsible for reviewing projects that involve, but are not limited to, recombinant DNA, RNAi, Dual Use Research (DURC), genetically modified microorganisms, plants and animals, artificial gene transfer, pathogens, biologically derived toxins, human materials and nanomaterials in accordance with the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules. The RSC is responsible for reviewing research that involves radioactive materials (RAM) and radiation producing equipment in compliance with the Nuclear Regulatory Commission (NRC) who provides institutions with licenses to work with RAM. The Laser safety program is designed to comply with the American National Standard for Safe Use of Lasers (ANSI Z136.1). The ORS works closely with GWPD, The Office of Health & Safety, Facilities Management and the Office of Risk Management. Rf.

### **10.3 Office of Ethics, Compliance, and Risk**

The Office of Ethics, Compliance, and Risk (OECR) maintains a webpage, [compliance.gwu.edu](http://compliance.gwu.edu), which provides information on the key areas of responsibility which include: ethics and compliance, policies, ethical misconduct and non-compliance reporting hotline, enterprise risk management, and internal audit.

All members of the university are individually responsible for holding themselves and the community to the highest ethical conduct and complying with laws, regulations, and university policies. Staff throughout the university have operational compliance responsibilities that are specific to their area. OECR has oversight and monitoring responsibilities of the operational compliance units to ensure compliance program effectiveness and risk mitigation in consideration of legal and regulatory requirements and compliance best practices. OECR also provides other institutional risk-based assurance services through oversight of university policies, ethics and non-compliance reporting hotline, the university's ethics program, and coordination with the internal audit, and enterprise risk management programs.

While this office is directly supervised by the President, there exists a dotted line reporting relationship to the Committee on Audit and Compliance of the Board of Trustees in support of fulfilling the independence required for the Compliance Officer and to satisfy the board's governance oversight responsibilities. OECR manages the related areas of ethics, compliance, and risk through a robust ethics and compliance program. The program meets the standards set out in the Federal Sentencing Guidelines and the DOJ's Evaluation of Corporate Compliance Programs. Standard operating procedures are available for all program elements and can be provided upon request.

### 10.3.1 Ethics Matter

The overall tone set by GW leadership and executive management encourages a culture of integrity and ethical behavior. The foundation is rooted in the university's *Code of Ethical Conduct*, which states that “for the university to maintain the desired ethical culture and public confidence, all persons acting on behalf of the university should maintain the highest level of ethics in all of their actions, and must comply with university policies as well as applicable laws and regulations.”

GW's [Code of Ethical Conduct](#) sets forth the standards of ethical conduct to which all persons acting on the University's behalf are expected to adhere. The Code is publicized on the “Ethics” page of the [GW OECR website](#) and referenced on HR website and Office of the Provost website. The standards of ethical conduct outlined in the Code are incorporated into other codes of conduct and policies and procedures at the university. Examples of key relevant policies that incorporate the ethical standards are specifically highlighted in the document. The ethical standards relate to:

- Integrity and Respect
- Responsibility and Accountability
- Absence of Conflicts of Interest and Commitment
- Absence of Harassment and Abuse of Power
- Stewardship of University Resources
- Compliance, Reporting and Investigations

OECR, in partnership with HR, assigns Ethics Matter training to new employees within the first 30 days after hire, which provides an overview of the Code of Ethical Conduct, key university policies, and the responsibility of all community members to hold themselves and others to the highest standards of ethical and lawful conduct. Generally, undergraduate students are introduced to the Code of Ethical Conduct via online summer training as well as it is included in orientation documents. OECR also distributes an annual communication from the President to the GW community stressing the importance of fostering an ethical culture and reporting ethics and non-compliance concerns. Additionally, an annual tailored communication for managers highlighting their heightened responsibilities to promote a culture of disclosure free from retaliation is distributed.

### 10.3.2 Ethics and Compliance Reporting Mechanisms

Various [reporting avenues](#) are available to the community including the EthicsPoint Hotline. OECR is available for consultation at [comply@gwu.edu](mailto:comply@gwu.edu) and 202-994-3386.

The EthicsPoint Hotline (“hotline”) is a reporting mechanism, available 24 hours a day, 7 days a week. The hotline, which includes both a phone line and online web-reporting tool, is operated by NAVEX Global and allows for confidential, anonymous reporting by the university community (e.g., violations of laws, regulations, university policies, unethical behavior). OECR reviews all items reported through the hotline to assess whether the item relates to external laws and

regulations or significant violation of university policy and collaborates with other university units as needed.

Standard Operating Procedures, Investigation Protocols and bi-annual reporting to the Board of Trustees are established.

### 10.3.3 Conflict of Interest and Conflict of Commitment

OECR manages and administers an annual conflict of interest and conflict of commitment disclosure process for the university. Research-specific (transactional) disclosure requirements are conducted by OVPR as part of the research processes.

The university's annual conflict of interest reporting process solicits, records, reviews and responds to disclosures made by defined members of the community (e.g., Trustees, Executives, Staff, Senior Researchers and Faculty, and former Trustees, Officers, and Key Officials). The process includes policies governing the reporting obligation, standard disclosure forms for each population with supporting documentation, thorough review, and action, and electronic repositories of information gathered. OECR partners with OVPR for coordination between the annual disclosure process and the research transactional disclosure process to support full disclosure analysis and management of a faculty or investigator. OVPR has responsibility for analyzing and addressing research related disclosures, whereas OECR has responsibility for all non-research disclosures.

Any reported conflicts (or potential conflicts) that warrant counseling or management are documented, agreed to by the parties, and held in a repository. An annual report with aggregated data on the results of COI/C program is presented to the Committee on Audit and Compliance.

OECR, in collaboration with the Procurement Department, maintains a Vendor Watch List. The Vendor Watch List includes the vendor and the individual that has a real or perceived conflict with the vendor. The list is updated annually at the end of the review cycle and in the event where a new conflict is identified. Procurement flags the vendor as conflicted and follows a process (documented in an SOP) of review to determine if purchasing is appropriate.

### 10.3.4 University Policies

A critical component of the university's compliance program is the development, review, update and training, communication, and enforcement of university policies. OECR maintains and publishes all university-level policies on the [OECR website](#) as well as internally within a policy management tool, OneTrust. Policy principles, common template, and process guide and workflow are established and documented for reference by the policy owners.

The annual policy review process includes an annual review, establishment of Responsible University Officials and Staff Delegates, and an emphasis on compliance plans highlighting training, communications, and enforcement plans specific to each policy. Approval for new and materially changed policies is done through a Policy Approval Board made up of members of

senior leadership. The annual policy review process aims to keep all university policies updated with the current standards and guidance relevant to each policy.

Schools and departments may have procedures or guidance that are unique to their environments or activities which are outside of the university policy program.

### 10.3.5 Other Compliance Related Activities

From time to time, OECR facilitates working groups for addressing compliance matters that have cross-organizational implications, such as Digital Accessibility Committee, NDAA Section 889 Compliance, and Drug Free Schools Act Biennial Report development.

## **10.4 GW Privacy Office**

The GW Privacy Office maintain a webpage, <https://privacy.gwu.edu/>, which provides information on the privacy program, policies, and training opportunities.

GW's Privacy Office plays a central role in executing the university's commitment to following best practices concerning data privacy and protection of the personal information of the GW community members. A single point of contact receives inquiries, investigates, and provides solutions working primarily with the Office of General Counsel, Office of Vice President for Research, GW Information Security, and GW Data Governance teams. The Privacy Office also uses industry, experts and peers to understand and assimilate emerging concerns, best practices, and market trends. In addition, this role is responsible for establishing, implementing and maintaining the privacy program, policies, procedures, training and monitoring compliance of such.

The Privacy Office leads the university's data management efforts by collaborating with university stakeholders to classify data and coordinate with the Office of the Senior Vice President and General Counsel as necessary to meet regulations and laws, including but not limited to FERPA, GLBA, HIPAA, GDPR, and PIPL. In this capacity, there is a designated data privacy officer who, with the University's Privacy Manager and GW IT Security team, leads compliance efforts, including monthly and annual training, policy development, evaluation of administrative, physical, and technical safeguards of personal information, and collaborating with stakeholders to apply corrective actions where appropriate. A 15-minute FERPA course is assigned to all new hires and several HIPAA courses are assigned to specific higher risk populations on an annual basis. GW is not currently designated as a HIPAA covered entity but continues training and monitoring of operations as best practice.

The Privacy Office leads the university's data management strategy through the Statement of Privacy Principles, the Website Privacy Notice, Personal Information Privacy Policy, Data Protection Standards, and the Records Management Policy. The Privacy Office plays a key role in the Data Incident Response process, Data Loss Prevention program, and terms and condition reviews for contracts with data collection or use.

Data Management serves as a lens into the life cycle of university data, which includes the collection, use, distribution, retention, and disposal of data by the university community. The Privacy Office provides guidance to GW faculty and staff in determining how to categorize and identify which types of information need specific levels of protection, roles and responsibilities for its care, and establishing appropriate timelines for when to dispose of the information. Three to four workshops and trainings are offered virtually on a monthly basis, several on-demand courses are available in our LMS, and in-person sessions are held, as requested, to meet the needs of a particular department, in coordination with other relevant university offices.

### **10.5 Office of Human Research (OHR)**

[The Office of Human Research \(OHR\)](#) is the administrative support office for the GW Institutional Review Boards (IRBs). OHR has a staff component of nine (9) staff members who are all experts in various areas relating to human subjects' protection. The IRB is responsible for the review and approval of all research activities conducted by GW students, faculty and staff that involve human subjects in accordance with federal regulations and guidance. OHR assists the IRB with reviewing research projects that involve human subjects to ensure that two broad standards are upheld: first, that subjects are not placed at undue risk; second, that they give uncoerced, informed consent to their participation. Projects involving human subjects research are reviewed in the proposal stage - before subjects are recruited. Many approved projects are re-evaluated annually per the federal regulations 45 CFR 46. All study changes and promptly reportable information are reviewed via submission of supplemental applications. OHR works with investigators to modify projects to ensure adequate protection for its subjects' rights and welfare. OHR administers the GW Human Research Policy which requires all investigators and study team members to take training in Human subjects, responsible conduct of research and conflict of interest. OHR provides training opportunities and educational outreach sessions for investigators in areas relating to Human subjects.

### **10.6 Office of Animal Research (OAR)**

The George Washington University [Office of Animal Research \(OAR\)](#), is the core or centralized laboratory animal support facility for the School of Medicine and Health Science (SMHS) and other University teaching and research programs using animals. The OAR is fully accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care International (AAALAC) with continuous accreditation since April 1974. The OAR maintains an Assurance with NIH Office of Laboratory Animal Welfare (OLAW) and is registered through the USDA-APHIS. The modern 25,561 square foot facility is located primarily in Ross Hall in addition to Science and Engineering (SEH) Hall and occupies facility housing and support space on five floors. The core is arranged in a vertical array with floors connected by a service elevator from the basement (B1) to floors 4, 5, 6 and 7. The facility also provides an examination and treatment room, quarantine, a diagnostic laboratory, isolation, cage sanitation, radiology, necropsy, and a surgery suite.

The highly experienced and qualified OAR veterinary and laboratory animal care staff maintain eight species of research animals as well as multiple breeding colonies and provide animal care

and technical support for the animal research community. The animal health care program is under the direction of a board-certified laboratory animal veterinarian who serves as the Attending Veterinarian (AV) and managed by a facility manager who oversees the trained animal technicians. Animals in each room are observed daily for signs of illness by the animal technician responsible for husbandry. Routine veterinary medical care is provided to all animals by veterinary technicians under the direction of the AV.

The animal facility is equipped with the Xenogen IVIS-Spectrum imaging system (Xenogen Corporation) to detect the bioluminescence imaging of a whole mouse. An additional 1500 sft fully serviced facility is available in the Science and Engineering Hall.

### **10.7 Data Use and Management**

GW policy sets forth information security standards for the protection of Non-Public Information within the University. All GW members have the duty to protect University data from unauthorized generation, access, modification, disclosure, transmission or destruction. Certain data require specialized protections, and in some circumstances, protections may be outlined through data sharing/transfer agreements with other parties, often referred to generally as Data Use Agreements (DUAs). DUAs are legally binding contracts between GW and another executing party providing for the transfer of data from the provider organization to the recipient organization. The Office of the Vice Provost for Research (OVPR) reviews the terms of proposed DUAs so that data may be accessed and used as soon as an appropriate Data Management Plan has been approved.

Following requirements of the National Science Foundation (NSF), National Institutes of Health (NIH), and other research granting entities, Data Management Plans (DMPs) are generally required by data providers to document and address all requirements for protecting the data. Data Services Librarians in GW Libraries, in coordination with the GW Privacy Office, Information Security and Research Technology in GW Information Technology and the Office of Research Integrity (ORI), work with researchers to provide guidance and ensure appropriate data management and stewardship protocols are employed. GW's DMPTool platform provides a flexible framework for researchers to manage DMPs and get access to resources pertaining to data management. GW data management plans entail a required security review and risk assessment, ensuring that data are managed securely and consistent with relevant compliance requirements and risks.

In addition to Data Management Plans, NIH has issued the Data Management and Sharing Policy to promote sharing of scientific data. In order to better support the provenance of data management, and compliance with the NIH data sharing policy in particular, GW researchers have access to an institutional license of LabArchives Electronic Lab Notebook.

For more information visit:

<https://libguides.gwu.edu/data-management>,  
<https://researchintegrity.gwu.edu/data-use-and-sharing> and  
<https://researchintegrity.gwu.edu/data-management-plans>.

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## **SECTION 11: Institutional Commitment to Investigators**

### **11.1 Resources for Career Development**

The Office of the Vice Provost for Research (OVPR) Research Enhancement Unit (REU) provides faculty with support to successfully apply for federally-sponsored research funding. The OVPR REU provides George Washington University (GW) investigators with various support including assistance with early-stage project ideation, identifying funding opportunities, building and working with interdisciplinary teams, and proposal development support. REU convenes trainings and seminars on various topics including those focused on specific funding mechanisms and other curated gatherings such research salons, which are designed to connect and engage GW faculty from diverse disciplines in collaborative intellectual and scholarly exchange around research-themed issues, questions and challenges. OVPR also offers intramural funding competitions designed to support scholarly and creative activities, assist faculty with developing interdisciplinary and other types of research and seed efforts to pursue external funding. Regular or research faculty, and research scientists eligible to serve as PI and their graduate students may request services from the OVPR Research Enhancement Unit. These services are offered in tandem with the School of Public Health's Senior Associate Dean for Research.

### **11.2 Writing Resources**

The [GW Writing Center](#) offers free, peer-based support to students and faculty from across the university through 25- or 50- minute appointments, which can be in-person or virtual. We support writers at all stages of the writing process, such as choosing a topic, developing ideas, organizing, and revising. Writers working on complex projects can meet with the same consultant for four weeks or longer through the [Long-Term Project Program](#). Grammar, revision, and citation materials are available at [Resources for Writers](#).

### **11.3 GW Advanced Support for Research**

LAI helps faculty and students to obtain the advanced research skills they need to succeed. [Workshops](#), in class instruction and [personal consultations](#) are available in:

- Coding & Programming
- Copyright
- Data Management Plans
- Digital Storytelling & Multimedia Tools
- Library Resources
- Mapping & GIS
- Multimedia & Digital Storytelling
- Open Educational Resources

## GWSPH Facilities & Other Resources

- ORCID
- Publishing
- Research Data Management
- Specialized Research Collections/Archives
- Statistical Analysis

Faculty, staff, and students can schedule [individual consultations](#) with one of our librarians in any of these content areas, and [attend workshops](#) on these topics.

### 11.3.1 Open Source Program Office (OSPO)

[The Open Source Program Office \(OSPO\)](#) coordinates and supports open-source software across the university, helping researchers and educators embrace open-source tools and practices. It aims to create a culture of open collaboration and knowledge sharing aligned with GW's research and educational mission. We promote open-source software development, open data, and open access in research and education. We support our community in adopting open practices to grow our impact on a local and global scale. The OSPO also provides consultations, training, tools, and resources in support of open-source software, open science, and open education. To learn more about how the OSPO can support your open source work or if you are excited to join the GW open source community, please contact us by email at [ospo@gwu.edu](mailto:ospo@gwu.edu) or [book a consultation](#).

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## **SECTION 12: Research Communication**

To assist researchers' efforts to communicate their ideas visually, [the Office of the Vice Provost for Research \(OVPR\)](#) and [GW Communications and Marketing](#) helps in communicating research for upcoming grant awards or research publications! This allows time for media promotion, coordination with the journal on a publication date, and an embargoed press release. Through your research and expertise, you have the potential to impact the conversation around important issues of the day. One effective way of doing that is through Op-Eds and other first-person commentaries that reach diverse audiences within and beyond the academic community. Sharing your knowledge through an Op-Ed is often a great way to both draw attention to your research and work while also informing on issues important to policymakers, industry leaders, other academic researchers and the broader public.

### **12.1 GW Research InnovationFest Showcase**

The [GW Research InnovationFest Showcase](#) provides students, faculty, and postdoctoral scholars with the opportunity to present their impactful research, scholarship, creativity, and entrepreneurship at George Washington University (GW). This annual event aims to highlight

the wide range of research and discoveries addressing significant disciplinary, cross-disciplinary, and global issues being conducted at GW through:

- Panel discussions, performances, presentations, and pitches
- Hands-on demonstrations by cutting-edge scholars
- A pop-up-style “marketplace” with products and inventions launched by GW entrepreneurs
- Art x Science gallery highlighting creative and multimedia work
- Poster presentations by students, faculty, and postdoc scholars

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### **SECTION 13: Computing Technology Resources**

GW is connected to research and educational communities via wireless access service, Eduroam, a secure, worldwide roaming access service developed for the international research and education community. It allows users from member institutions to connect to the Internet when visiting other participating institutions.

GW is a member of the Internet2 Network, which is a computer networking consortium led by members from research and education communities, industry and government providing a secure high-speed network, cloud solutions, research support, and services tailored for research and education. GW is a participant in Internet2’s InCommon federated identity and access management system, providing access to many research resources and collaborative services, as well as the eduroam wireless service. Eduroam provides GW faculty, staff, and students access to over 2,500-member wireless networks in the US and over 33,000 member networks worldwide by using their GW identity.

GW Information Technology is a comprehensive shared service organization supporting all IT services and systems. In addition to central IT services available throughout GW, SPH has dedicated hardware and software platforms available. The SPH hardware offerings include dedicated research platforms and file servers as well as printers, FAX machines, high-speed photocopiers, overhead and data show projectors. Access to these resources is via GW’s high speed wired and wireless networks. There are dedicated resources for data storage, data transfer and sharing and data backup and redundancy.

The software offerings at SPH are also comprehensive. Our capabilities will allow for any required reference retrieval, any other data retrieval or exchange, and online databases access. All faculty, staff, and students have access to electronic mail, and collaboration software such as Webex and Skype to convene and share documentation offsite. SPH faculty and staff members also have access to licenses that include an extensive range of word processing, analytic, graphics, mapping, and presentation software such as, SPSS, Stata, SAS, Atlas.Ti, MPlus, Adobe Creative Suite, Nvivo, Qualtics, and ArcGIS.

### 13.1 Armor Defense

The SPH has established a relationship with the cloud vendor Armor Defense to support a highly secure infrastructure to fulfill the research needs of our faculty, research staff and their students as it relates to high-speed data analysis, data storage, and collaborative data sharing. Armor Defense has customized a service for our SPH researchers and a secured centrally managed, cloud-based data storage service. This system supports research and applied research instruction of the SPH faculty and their graduate students and postdocs. Researchers may use the system to work with both small and large-scale research datasets and collaborate more effectively on research with colleagues and students across schools and departments. It also allows for inter-institutional collaboration in which researchers are able to collaborate and share access to data across the world. Armor Defense is certified against the HITRUST Common Security Framework (CSF) to address HIPAA compliance requirements. The Health Information Trust Alliance (HITRUST), in collaboration with healthcare, business, technology and information security leaders, has established the HITRUST CSF, a certifiable framework that can be used by any and all organizations that create, access, store or exchange personal health and financial information. Armor inherently meets the FIPS 140-2 standard.

### 13.2 Research Cloud

In addition to REDCap and Armor, several secure cloud computing and storage environments are customized for SPH research projects by GW IT Research Technology Services. These environments leverage AWS and Microsoft Azure depending on research workflows, system integration, and data security requirements.

### 13.3 StrongBox

StrongBox is a customized applications and data storage system that is dedicated to research at the SPH and their faculty, graduate students, and post-docs. Researchers (a) store and preserve their research data for future research and “training” sets for students; (b) work with both small and large-scale research datasets, and (c) collaborate more effectively on research with colleagues and students across schools and departments.

### 13.4 Box

[GWBox](#) is GW's enterprise file sharing service for online cloud storage and collaboration for GW faculty, staff and students, especially for regulated or restricted data. GW Box uses a two-step authentication process for system access. Two-step authentication provides users with secured access to their online information utilizing a password plus a code sent to a smartphone or device. Users store regulated, restricted and public university data on GW Box.

### 13.5 High Performance Computing

The flagship high-performance computing resource at GW is the Pegasus cluster. Pegasus consists of 210 compute nodes of diverse configuration, from over 100 40-core “CPU” nodes with 96GB of RAM, 60 nodes with 384GB RAM, and 3TB “high-memory” nodes, plus 39 GPU-

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enabled node configurations. Over 20% of the Pegasus nodes have GPUs, with 1, 2, or 4 Nvidia V-100s per node. The robust cluster utilizes the Dell R740 and C4140 platforms.

Interconnect fabrics for Pegasus include 100Gbps EDR Infiniband for compute and scratch file system fabrics and 10Gbps Ethernet for login, job control, and NFS. Pegasus includes two file systems, each with 2 petabytes (PB) of storage: one high speed “scratch” Lustre file system based on DDN Exascaler platform, the other NFS for home and group persistent storage based on DDN’s GridScaler platform. <https://www.hpc.arc.gwu.edu>

While Pegasus is in its fifth year of initial lifecycle, it follows in a tradition of institutional support for HPC, beginning with the inaugural “Colonial One” HPC cluster in 2012. Institutional commitment for HPC will continue with ongoing collaboration between the Provost and Office of the Vice Provost for Research, the respective schools, centers, and institutes of GW’s growing research program, and Research Technology Services.

In addition to Pegasus, RTS offers smaller clusters for teaching and HTCondor applications to the GW community, and assists managing several legacy research groups’ clusters throughout the GW research community.

To support research computing, RTS also operates a Data Transfer Node, leveraging the Globus toolkit, including connectors to the Google Drive and Box cloud storage platforms to enable data transfer, collaboration, and research data archive.

As part of GW’s continued institutional commitment to deep learning and AI research, GW is currently planning to augment existing HPC resources with more GPU-intensive systems, including two nodes with 8 high performance Nvidia A100 GPUs. While these nodes will be available to enable advanced GPU-based computational research throughout GW, priority access will be granted to any extramurally funded AI and deep learning efforts. These deeper GPU resources are expected to be online in Fall 2023.

### 13.5.1 Colonial One

Colonial One is the GW high-performance computing (HPC) environment for research data analysis which includes two generations of HPC computing clusters, Colonial One and Pegasus. These clusters are housed in one of GW’s two enterprise-class datacenters and is located on the Virginia Science and Technology Campus. The datacenter features professional IT management by GW’s central Division of IT - including 24-hour on-premise and remote environment monitoring; redundant power distribution including UPS (battery) and generator backup; redundant cooling systems utilizing a dedicated chilled water plant and a glycol refrigeration system; and direct network connectivity to GW’s robust 100 Gigabit fiber optic network. Colonial One’s compute capacity features a total of 2,924 CPU cores and 1132,288 CUDA cores with FDR InfiniBand network interconnect featuring 54.5 Gbps total throughput, with 2:1 oversubscription per compute node. The GW Pegasus configuration consists of 8,112 CPU cores, 76,800 NVIDIA Tensor Cores and 614,400 NVIDIA CUDA Cores. More information

on the overall current HPC set up can be found here: <https://colonialone.gwu.edu/new-colonial-one-info/>.

### 13.5.2 FREESCO

FREESCO is a high performance virtual environment that provides virtual machines with direct access to a 100GB network infrastructure. It is integrated with the high performance high capacity cluster, Colonial One, located on the GW Virginia Science and Technology Campus (VSTC).

### 13.5.3 Data Center and Network Facilities

The majority of GW's research computing facilities, including the Pegasus HPC cluster, reside at the GW Virginia Science and Technology Campus (VSTC) Enterprise Hall. The VSTC campus is a world-class center of collaboration with centers, institutes and laboratories conducting interdisciplinary research in many growing fields. Faculty, graduate students, research scientists, and government and corporate partners conduct advanced research in well-equipped facilities. This VSTC data center is a 6,100 square foot data center facility with diesel generators exceeding one megawatt of capacity providing up to 36 hours of generator runtime. In addition to the VSTC data center, the Science and Engineering Hall on the GW Foggy Bottom campus houses other research systems, especially for research groups in the GW School of Engineering and Applied Science. The SEH data center is approximately 1,300 square feet with a 1500kW diesel generator, providing 55 hours of 100% runtime. The GW campus network is extensively connected to both the commercial and research and education networks. The network is served by three different commercial ISPs in three locations, providing three full internet route tables, both legacy IP and IPv6. Commercial peering provides direct access to over 200 networks.

## **13.6 Research Network Storage**

The GW Research Network Attached Storage ("Research NAS") service is a replicated, multi-protocol, scale-out network attached storage system, that supports high-speed, secure network storage to the GW research community. This service is suitable for supporting numerous scientific applications, from high-throughput laboratory instruments to HPC systems and other research computing environments. Currently with one petabyte (1PB) of capacity is replicated between the VSTC Enterprise Hall and Foggy Bottom data centers for resiliency (total 2PB), the system is able to scale with additional demand and is on a regular technology refresh cycle of four-to-five year cadence. The Research NAS service is supported by GW institutional funds as well as cooperative support from SPH and other GW schools.

Each research group or project from member schools are granted initial allocation of 10 terabytes (TB) of base storage capacity, with additional storage available on a per-TB additional cost basis. By integrating with GW's Enterprise Active Directory, file and folder permissions are managed according to group and role-based access controls, providing a strong security model for research data.

### 13.7 Research Electronic Data Capture (REDCap)

GW operates an instance of the REDCap ([Research Electronic Data Capture](#)) environment, a critical research support system for several projects in SPH. REDCap is a secure web application for building and managing databases, forms, and surveys and is particularly well-suited to human subject research data, including data with HIPAA compliance requirements. GW's REDCap environment is hosted on the AWS platform, providing flexible storage and scalability, and is managed by a full time REDCap Administrator. GW's REDCap uses the InCommon federated identity platform, allowing GW researchers to securely collaborate with researchers from other InCommon member institutions on the REDCap platform.

[Research Electronic Data Capture \(REDCap\)](#) is a secure, HIPAA-compliant, web-based application used for building and managing online surveys and databases. It is utilized globally in over 150 countries and across 6000+ institutions, making it the preferred database platform in Clinical and Translational Science Institutes awarded institutions, and other institutions worldwide.

GW REDCap was launched in 2020 and has since served as a research tool for over 1000 personnel. With over 800 database projects created for research and operational support, it has proven valuable for various purposes.

Features:

- No charge for current GW faculty, staff, students, and sponsored affiliates conducting clinical and translational research.
- Accessible support through email and training provided by the GW REDCap team.
- Powered by Research Technology Services (RTS).

### 13.8 GW IT Research Technology Services

[George Washington Information Technology](#) (GW IT) provides a number of research computing services for GW students, faculty, staff and community members. These services support computationally and data intensive research and are designed to accelerate achievement of the university's research and education goals, provided in partnership with GW's schools, centers, and institutes and center around enhancing GW's research competitiveness and success. RTS can also assist GW researchers by coordinating with IT Security to ensure appropriate application security and risk assessments are performed for custom applications or software deployments.

Research Technology Services (RTS) operates as an institutionally supported shared service organization, enabling cross-disciplinary research by delivering a broad portfolio of dedicated and shared platforms and services for GW schools and research programs. This office works in partnership with researchers and research administration to support research programs, promoting shared infrastructure and next generation technology and thus advancing the competitiveness of GW's ever-evolving research infrastructure. These collaborations increase the competitiveness of GW's ever-evolving research infrastructure. In order to develop, support,

and improve visibility of such services, collaboration with key service providers and campus partners is instrumental.

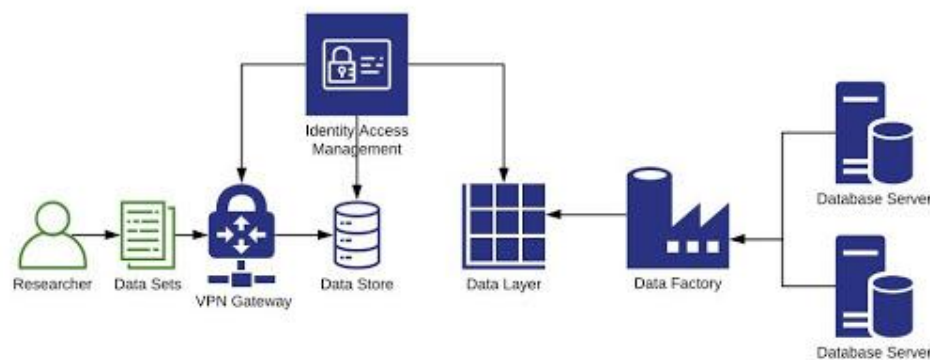
The RTS group has over sixteen full-time professional staff with the mission of broad support for GW's research computing needs. In addition to core High Performance Computing and Research Storage services, the RTS team engages in research enablement and cloud engineering services, as well as operating the Capital Area Advanced Education and Research Network (CAAREN) and a REDCap data management environment.

### 13.8.1 Running Custom Software Securely

For researchers who want to securely host a software application, either that they built or are providing the source code, this Software Application will be able to leverage GW's high-performance computing nodes. Jobs are submitted to GW on premise services. Below is a potential solution to this challenge.

#### **Design Pattern - Secure Data Warehouse**

**Researcher wants to securely aggregate and store multiple datasets**



The above solution is comprised of the components below:

- Virtual Private Network
- Application Server
- Identity Access Management
- Database Server

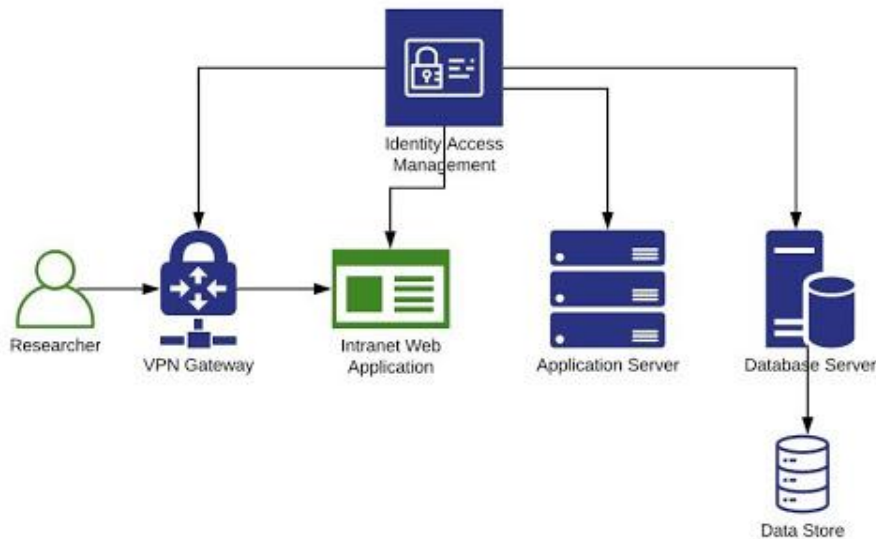
In this solution, the researcher provides the code, the code is deployed onto an existing application server on the VPN, the application is granted permissions to submit jobs to HPC (typically using SLURM).

This framework can be implemented for many potential applications, whether they are applications written by the researcher or hosted software, like Galaxy, to be used by a researcher's team.

### 13.8.2 Working with Data Securely

Many researchers require a space for working with and managing a repository of their data. This data usually consists of numerous sources and varying types. They need the ability to work with and aggregate data in real time.

#### **Design Pattern - Secure Custom Application with Secure Data Researcher wants to deploy Custom Application to access Secured Data**



The above solution is comprised of these components:

- Virtual Private Network
- Identity Access Management
- Database Server
- Data Factory
- Storage Solution

Under this solution, the researcher would provide the data and the data use agreement (DUA). Data is brought into a data factory on the VPN in a tiered process. First the data is staged, uploaded or imported data is cached in data storage in accordance with the DUA. Second, the staged, or if external data is being imported in real time, is then aggregated and stored in the secure data warehouse. After the data has been brought into the warehouse, in accordance with the DUA, layers and views are made available. The researcher is allowed to grant explicit permissions to layers and views of data that have been transformed in the warehouse.

### **13.9 Additional GW IT and RTS Resources**

#### 13.9.1 CAAREN – Capital Area Advanced Research and Education Network

As part of its mission as a leading research institution, [GW operates the Capital Area Advanced Research and Education Network](#) (CAAREN). Built on a 140-kilometer optical service with a

deployed capacity of 4x100Gbps + 8x10Gbps with a maximum capacity reaching well into the multi-terabit range. The primary function of CAAREN is to connect capital area universities and research centers to national and international research networks via Internet2.

CAAREN is an initiative launched in 2013 designed to deliver a high-performance research and education infrastructure facilitating world-class research, education and knowledge sharing in the national capital region. CAAREN offers research network services to government, education, and research organizations, as well as some private-sector organizations within the District of Columbia and Northern Virginia. CAAREN enhances collaboration and reduces barriers to research, education, and health applications, supporting the national capital region as a center of cutting-edge knowledge. Current customers include GW, Georgetown University, American University, The World Bank, and Children's National Medical Center.

### 13.9.2 Shared Research Infrastructure

These services are built on our enterprise service infrastructure for data center hosting, networking, storage, application, and compute needs. These services are part of the standard IT service portfolio and delivered in partnership with service partners in the Libraries, Schools and external providers.

### 13.9.3 GW IT Security and Risk

GW IT Security & Risk is responsible for IT governance, risk and compliance. This includes establishing cybersecurity policies and best practices, providing expert consultation with regard to information security, performing security risk assessments and monitoring risk remediation, and providing support for incident response and information security forensics. All hardware and software procured by GW complete an IT Security review as part of the University's procurement process.

### 13.9.4 Advanced Engineering and Support Services

GW IT works with schools, business units, and researchers to identify and implement IT solutions, while addressing specific needs of the George Washington University community. Consulting services include evaluation and recommendation, provisioning, integration, management, and support.

- Enterprise Services provided by GW IT to School of Public Health
  - Desktop and Mobile Computing Support (Endpoint Management)
  - Administrative and Business Support (Enterprise Resource Planning Systems)
  - Information Security
  - Communication and Collaboration (Telephones, Conferencing, and Productivity Software)
  - Teaching and Learning (Classroom Support)
  - IT Infrastructure
  - IT Professional Services
  - Email and Calendar
  - Account Management

### **13.10 Student Technology**

GW has valuable technological services for students. These are important component of a successful academic and social experience at the University. High-speed Internet connections in the residence halls and convenient indoor and outdoor wireless hotspots (GWireless) give GW students access to many online resources. Students have access to a wide range of productivity and collaboration software such as Google Workspace, Microsoft 365, Cisco WebEx, and Zoom. Through GWMail, which uses a Google Mail interface, students have six gigabytes of storage space. For extensive technology support, GW Information Technology offers convenient walk-in and hotline hours for students.

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## **SECTION 14: Student Support**

### **14.1 Student Research in the School of Public Health**

In order to ensure that GWSPH students are able to respond to the health needs of the various environments under which they serve upon successful completion of their GW studies, GWSPH supports and encourages undergraduate and graduate student research projects involving human subjects. The school provides numerous opportunities within the curriculum for students to undertake research in fulfillment of their academic requirements. These include dissertation (e.g., honors and masters' projects), MPH culminating experience (CE), MPH practicum, biostatistics consulting practicum, field lab experience, independent study, internships and other classroom requirements/activities. Some of GWSPH students have the opportunity to work with Principal Investigators (PIs) for a semester and be actively involved in planning experiments, collection and analysis of data, or performing literature reviews.

These experiences are designed to increase student exposure to research and encourage enrollment in PhD programs. Much of student involvement can result in student abstract submissions plus authorship on peer-reviewed publications. The GWSPH provides financial support for meritorious research conducted by students using various mechanisms including dissertation awards. Student research achievements are recognized within GWSPH and across the University in various ways including participation in an annual GW wide Research Days event. The GWSPH takes pride in its effectiveness in training undergraduate and graduate students through high-quality research opportunities, rigorous standards, and individual responsibility. The GWSPH continues its long-held tradition and commitment to student preparation leading to careers in public health through meritorious research, allowing them to continue to make meaningful contributions to the public health field. The Office of Research Excellence (ORE) provides oversight over student research activities to ensure that they are conducted using high ethical standards and comply with federal and state regulations as well as relevant institutional policies. Students submit their project plans to ORE for review and clearance through an electronic portal that has been established for that purpose.

## **14.2 The Student Health Center (SHC) at GW**

[The Student Health Center \(SHC\)](#) is a multidisciplinary, integrated, student healthcare service that provides outpatient confidential, student-centered care in an accessible, safe, culturally sensitive, and supportive environment.

## **14.3 Division for Student Affairs at GW**

[The Division for Student Affairs \(DSA\)](#) cultivates an inclusive community that supports connection, growth, and well-being for every student throughout their GW journey. DSA's integrated approach is to provide a cohesive student experience built upon four core values: approachability, collaboration, compassion, and honesty.

With distinct units including, Campus Living & Residential Education; Campus Recreation; Mount Vernon Campus; Orientation, Class Year, & Families Programs; Student Health Center; Student Life; Student Rights & Responsibilities; and Student Support, we work together to contribute to student success and belonging at GW, with our vision of "you belong here" always in mind.

## **14.4 The Multicultural Student Services Center (MSSC) at GW**

[The Multicultural Student Services Center \(MSSC\)](#) has developed strategies for student success through diversity education, programs, and services. MSSC emphasizes the importance of providing learning, reflecting, and connecting spaces for students around gender, race, culture, sexual orientation, spirituality, and socio-economic status.

## **14.5 Center for Undergraduate Fellowships and Research at GW**

Housed in Gelman Library, a unit within Libraries and Academic Innovation, the [Center for Undergraduate Fellowships and Research](#) provides individualized and group mentorship to all GW students and alumni pursuing national awards, fellowships, and undergraduate research opportunities.

The Center for Undergraduate Fellowships and Research will empower scholars through culturally responsive mentoring and serve all George Washington University undergraduates and alumni pursuing intellectual development through scholarship and fellowship competitions and undergraduate and postgraduate research participation.

Our vision is to become a premier academic unit at GW and the District of Columbia that nurtures diverse thought leaders to become global citizens who positively change the world through their scholarship.

### **Learning Outcomes**

- After working with staff in the Center for Undergraduate Fellowships and Research on a national award application or research opportunity, you will:

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- develop a well-constructed working knowledge of undergraduate and postgraduate nationally competitive awards and research experiences that serve as funding sources for academic and professional opportunities;
- effectively identify opportunities that inform and enhance scholarly productivity such as undergraduate research, internships, community leadership, language study programs, study abroad, and civic engagement;
- write a personal statement that demonstrates consideration of academic and career goals to a specific audience;
- develop verbal communication skills that demonstrate consideration of academic and career goals to a specific audience;
- enhance career self-efficacy to promote deliberate decisions; and
- develop or further develop a growth mindset.

### 14.6 Office of Graduate and Postdoctoral Affairs (OGPA)

[The Office of Graduate and Postdoctoral Affairs \(OGPA\)](#) works to advance graduate and postdoctoral programs and enhance the graduate student and postdoctoral fellow experience here at George Washington University. Their mission is to provide support to students, postdoctoral fellows, staff, and faculty engaging in graduate-level work and research by:

- Establishing and facilitating communication and cooperation among GW schools and colleges that support graduate education
- Providing guidance for graduate students and postdocs to ensure academic success, professional growth, and wellness
- Fostering a greater sense of community and connection for graduate students by creating engaging and valuable experiences

OGPA includes the [Office of Graduate Student Assistantships and Fellowships](#) (OGSAF), the [Office of Graduate Affairs](#) (OGA), and the [Office of Postdoctoral Affairs](#) (OPA). For more information, <https://gradpostdoc.gwu.edu/current-postdocs/benefits>

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## SECTION 15: Additional Support

### 15.1 Office of Innovation & Entrepreneurship (OIE)

The [Office of Innovation and Entrepreneurship](#) (OIE) provides programming around innovation, education and venture creation. For more than a decade, the office has helped forge relationships between aspiring GW entrepreneurs and the Mid-Atlantic startup community. TCO collaborates with OIE to train GW inventors who are interested in learning more about starting a company to develop their technology.

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- GW New Venture Competition

The [GW New Venture Competition](#) gives GW students, faculty, staff and alumni a real-world, experiential learning opportunity in entrepreneurship. Students compete in multiple tracks for different business types and work with mentors to craft and pitch a stellar idea. Winners of the New Venture Competition, which is the largest collegiate competition in the country, receive \$5,000 - \$50,000 to help launch their ventures.

- I-Corps

[I-Corps](#) is a National Science Foundation program designed to foster, grow and nurture innovation ecosystems regionally and nationally. This immersive, seven-week program prepares researchers to extend their focus beyond the university laboratory by providing hands-on training on how to successfully turn innovations into real-world products. The ultimate goal is to create a new venture or licensing opportunity for I-Corps participants.

- I + E Lab at Western Market Workspaces

The [GW Innovation+Entrepreneurship Lab](#) (I+E Lab) in Western Market provides all the physical and intellectual resources current GW students and faculty need to develop and grow, including one-to-one advising, office hours with industry experts, workshops, and events. Open co-working space is available to GW students and student groups looking to find a home and work on innovative ideas, startup ventures, and entrepreneurial projects.

### 15.2 GW Innovation Center at SEAS

The [GW Innovation Center](#) at the School of Engineering and Applied Science (SEAS) is a multidisciplinary, student-driven space for hands-on, experiential learning focused on social impact and design. It offers a supportive climate for ideation, creativity and entrepreneurial thinking, and facilitates knowledge transfer and acquisition of applicable skills, new domain exploration and interaction with peers from other disciplines.

### 15.3 International Services Office (ISO)

[The International Services Office \(ISO\)](#) at the George Washington University facilitates international educational exchange through its services and programs. It serves as the primary administrative, programming, and advising office for the GW international community. It provides resources to assist with transition to the U.S. as well as GW. ISO Advisors host a variety of special events that highlight the diverse international student population. Resources such as calling home, housing, safety, transportation, health and wellness, and other miscellaneous items are available, including visa and tax information plus advisement. International Student Advisors are available to meet with students, scholars and faculty who have immigration questions. The ISO is committed to improving the student life experience of all GW international students and scholars through programming and hosts ~80 events in a typical academic year. The ISO's programming is intentionally built around 4 support areas for international students, which include:

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- Orientation and Adjustment
- Immigration Support
- Professional and Career Support
- Social and Cultural Exchange

### 15.4 Office of Alumni Relations

[The office of alumni relations](#) serves more than 320,00 alumni in over 150 countries around the globe. Connected by a shared GW experience, we strive to build a greater world through engagement and service.

### 15.5 Center for Civic Engagement and Public Service

The mission of the [Honey W. Nashman Center for Civic Engagement and Public Service](#) is to integrate civic engagement into George Washington University's educational work. The Center for Student Engagement at GW enhances all aspects of the student experience by fostering communities that promote learning and development to prepare students to make positive contributions in the world. Recognizing that GW is a community of scholars, the Center for Student Engagement brings learning out of the classroom and works to implement innovative four-year, competency-based student learning outcomes that are personalized to ensure students achieve their unique goals and aspirations. Coordinated services include the Office of Alumni Relations, which serves the more than 225,000 alumni living in 150 countries around the globe and furthers three main goals: enabling lifetime engagement, gathering a voice for alumni, and building a culture of philanthropy. The Center focuses GW's resources to meet community needs beyond the campus; promotes equity and active citizenship in a diverse democracy; and enhances teaching, learning, and scholarship at GW. The Nashman Center provides support and funding for community engaged faculty teaching and research as well as for student community engagement and social innovation.

### 15.6 Disability Support Services (DSS)

[Disability Support Services \(DSS\)](#) is committed to ensuring all students with disabilities have equal access to educational opportunities. DSS also serves as consultants to others who may suspect their participation in an academic program is being compromised by a disability.

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