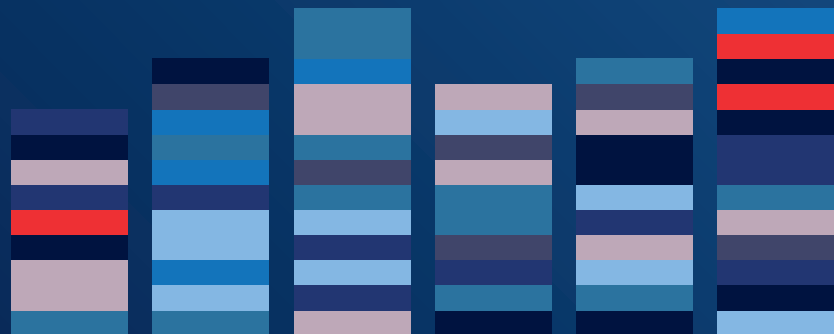




INSTITUTE FOR SYSTEMS GENOMICS

ANNUAL REPORT 23-24

UConn



DIRECTOR'S UPDATE

The ISG and the faculty, staff, students and collaborating partners within its ecosystem, have had yet another incredible year as we continue to see major advances in the application of genomic technologies in personalized medicine and therapeutics, conservation biology, genome editing, and synthetic biology. Building on last year's successes, the ISG continues to experience significant growth in areas of basic research, biodiversity, conservation genomics and sustainability as scientists strive to understand resilience and susceptibility of diverse species to a changing climate. Finally, emerging areas, such as the application of AI-driven approaches to genome-scale data analyses, are promising to bring more efficient and cost-effective means of achieving rapid scientific discovery and the implementation of new therapies and management strategies.

During the 2023-2024 academic year, the ISG welcomed graduate and postdocs to our membership and has seen a consistent growth in our Center and Core user base (over 320 faculty and >1,000 students supported!) and in the research output of our faculty, with funding exceeding \$260M and a yearly list exceeding 600 outstanding publications in both specialized and top-tier journals. Thus, genomics continues to be an area of growth and success at UConn. Many instances of our member faculty research triumphs have been reported in our newsletter, The Strand, but we know many outstanding stories remain to be told. We encourage you to share highlights for future issues.

Both the Genome Ambassadors Program and Genetically Engineered Machine Tech Incubator (iGEM) Programs have experienced growth in the programs offered and outreach activities supported, coinciding with the welcoming of Dr. Kate Castellano to our team. The Professional Science Master's program in Genetic Counseling, led by Dr. Maria Gyure, welcomed its first matriculating cohort in the Fall 2023. As the only genetic counseling program offered at a public institution in New England, this program is an exciting investment in workforce development for Connecticut – and the nation. We are also excited to announce the opening of a newly approved Certificate program in Genomic Data Analysis, under the direction of Dr. Noah Reid, which matriculated its first cohort this fall.

While our ongoing programs continue to run at maximum capacity, the ISG has established some exciting new collaborations. Last year, we welcomed our first cohort for the NSF funded postbaccalaureate program “From genome assembly to genomic novelty to phenotype: an integrated training framework”, led by Dr. Elizabeth Jockush in a collaboration between CLAS and the ISG. The first cohort finished their program in July with presentations at the international Society for the Study of Evolution meeting in Montreal, Canada and an exciting publication on scorpion genomes, in collaboration with Dr. Carlos E Santibanez Lopez and the Western Connecticut State University. In a joint venture between the ISG and UConn Center on Aging, the NIH sponsored program, “Education in Aging and

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Geroscience Research (EAGR)”, led by Dr. Ken Campellone, welcomed its first cohort of undergraduate trainees who are well underway in their research programs.

Under the leadership of Dr. Jill Wegrzyn, the Biodiversity and Conservation Genomics Program, in collaboration with CLAS, has completed its second cohort and the third is well underway this summer. This exciting program trains undergraduate and graduate students in coding and genome assembly through projects that target critically endangered species for the development of genomics resources. Culminating in a student-cohort led publication during the summer, this successful program continues to be in high demand in the 2024-2025 academic year, despite lacking financial support.

We have begun developing research strategies for our new HART (Health Analytics and Research Translations) Center Initiative, an exciting collaboration among UConn's ISG, UConn Health, the Connecticut Children's, Hartford Healthcare and JAXGM. This collaboration represents an academic-industry partnership in Greater Hartford that aims to provide access to neonatal sequencing and clinical interpretation for

the discovery of undiagnosed disease. While still in the planning phase, we are excited to start research in this exciting endeavor in the coming year.

Our major core facilities, the Center for Genome Innovation and the Computational Biology Core, have continued to see growth in users and revenue. Both are funded through fee-for-service revenue and generous support from the Provost, OVPR and HCRAC. However, much of our programming, such as the Genome Ambassadors, iGEM, Biodiversity and Conservation Genomics programs, and scientific programs, such as the Deep Ocean Genomes program, lack support. We have launched a fund-raising campaign to support these activities and the high-impact research and training programs within our ecosystem.

Lastly, the ISG is supported by an outstanding group of molecular biologists, genomicists, and computational biologists in our cores and a small, but incredible team of administrative personnel – each deserves recognition for building the foundation upon which the ISG continues to grow.



Rachel J. O'Neill, Ph.D.

DIRECTOR, INSTITUTE FOR SYSTEMS GENOMICS

Director, Center for Genome Innovation • Institute for Systems Genomics
Professor, Genetics and Genomics • Dept. of Molecular and Cell Biology
Professor, Dept. of Genetics and Genome Sciences • UConn Health
John and Donna Krenicki Professor in Genomics and Personalized Healthcare
UConn Board of Trustees Distinguished Professor

OUR VISION

The collective result of the efforts under the ISG umbrella is an emerging critical mass in genomics as evidenced in the growth of our membership, core and center usage, grant funding, and graduate programming. Our vision for the ISG is to solidify UConn as a top-ranking institution in genomics in the US. Capitalizing on our achievements, the ISG aims to grow its research portfolio and establish concentrations that will prime us for successful state-wide initiatives, federal collaborative grant opportunities, emerging training grant initiatives, and to meet the growing demands for genetics and genomics training and workforce enhancement across disciplines.

OUR MISSION

To establish world-class research and training programs in genome science, the breadth of the field of genomics was encapsulated under the ISG at its inception in 2012 and included research and training endeavors represented within each college and school at UConn. The coalescence of these activities, and growth built upon our successes, is in alignment with the evolving disciplines of genomics and geared towards increasing research grant funding and training to meet growing workforce needs. The specific goals of the ISG are:

- To establish a world-class program for research and training in Genomics and in Personalized Medicine by synergizing genomics-based activities, supporting emerging initiatives, and providing cutting edge genomics and computational biology technologies.
- To lower administrative barriers to collaboration among researchers at JAX and all UConn campuses in areas related to Genomics and to Personalized Medicine.
- To develop an academic structure that supports undergraduate, professional, and graduate education in genomics.

The ISG is an institute supporting one of the fastest growing scientific fields. The dedicated faculty and staff of the ISG's ecosystem are training the next generation of scientists and health professionals through collaborative, vigorous, and innovative research programs in areas related to functional and systems genomics; computational biology and bioinformatics; human, mammalian, microbial, pharmacological, immunological, statistical, and population genomics; and educational, ethical, legal, and social implications of genomic science and medicine.

Establishing World Class Programs:

- Investing in genomics innovations
- Offering genomics-based training and workforce enhancement
- Genomics in support of sustainability, health and global diversity
- Supporting the university community through COVID testing
- A commitment to diversity, equity and inclusion in genomics
- Supporting global awareness through community outreach

BY THE NUMBERS

141
Current Members

191
Non-ISG Members
Serviced By Data
Generation In Our
Cores/Centers

20+
Industry Partners

40
Departments, Schools,
and Colleges Represented

612
Peer-Reviewed
Publications in 23-24

\$256M
Research Portfolio



2 Interdisciplinary Undergraduate Programs



3 Online Graduate Certificate Programs



2 Professional Science Master's Degree Programs



1 Ph.D. Program in Systems Genomics



1 Postbaccalaureate Program

The ISG membership and specific users supported by our pillars, the Center for Genome Innovation, the Chromosome Core, the Computational Biology Core and the Single Cell Genomics Center (in collaboration with JAXGM) do not 100% overlap. We currently have 141 ISG members (isg.uconn.edu/isg-members/) and an additional 191 faculty serviced by data generation in our cores/centers that are distributed across UConn schools/colleges and departments yet are not ISG members. Moreover, the PIs of many student users among the >1,000 users of our Computational Core are not reflected in any of our lists yet are supported by the ISG. Thus, we have a base of genomics-focused researchers at UConn of >332 PIs. Please note, this data represents March 1, 2023- March 1, 2024.

CORE FACILITIES

Center for Genome Innovation (CGI)

The CGI continues to offer a diverse portfolio of sample preparation services including sample extraction, total RNA/genomic DNA/NGS library QC and many NextGen library preparation and sequencing applications for long and short read technology. Molecular karyotyping services as well as human methylation array processing are also available. All CGI services are available to UConn faculty, external researchers and for-profit companies across the nation and worldwide! UConn-affiliated researchers, students and staff have access to ancillary equipment in the laboratory located in Storrs, with hands-on training available for most pieces of equipment.

CGI Faculty Users: 128 faculty from UCH, Storrs and Avery Point campuses, and TIP companies, representing 32 UConn academic units (7 Schools and Colleges), additional users include 38 non-profit and international universities and 2 external for-profit companies.

The CGI offers formal laboratory-based workshops for a variety of NextGen sequencing applications, including RNA-Seq, amplicon sequencing and long read sequencing. If one-on-one training is preferred, the CGI can assist with on-site, hands-on training for all library preparation workflows for graduate and undergraduate students. Free consultations are always available for experimental design, budgeting and troubleshooting as well as manuscript preparation.

Notable Highlights

- 1 The Center for Genome Innovation further enhanced its long read sequencing portfolio in late 2023 to include the PacBio Revio. The CGI's current long read sequencing portfolio now includes the PacBio Sequel IIe and Revio, and the Oxford Nanopore PromethION and MinION systems. Sample preparation services have also been improved to include extraction services for ultra-long genomic DNA isolation and library preparation on the PromethION system.
- 2 In early 2024 the CGI acquired the Agilent Femto pulse system for ultra-long gDNA QC. This precise instrument is a part of the long read sequencing workflow but it can also be used to detect total RNA quality from a single cell!
- 3 The Center for Genome Innovation participated in the 2023 HCRAC Core Incentive Program where we worked with 3 different research labs on the UConn Health Campus to train students and develop NGS workflows, generating preliminary data for future grant applications.

CORE FACILITIES

Computational Biology Core (CBC)

The CBC provides computational resources and technical support to both academia and industry for projects in computational biology, with a focus on applications of high throughput sequencing data. Services provided include data analysis, consultation on project design and data analysis, code review, software installation, testing, and troubleshooting for work conducted on University high-performance computing resources, and software development.

The CBC offered a range of virtual workshops on a monthly basis covering various bioinformatics topics such as RNAseq, variant detection, genome assembly, genome annotation, and RADseq analysis. These workshops were attended by researchers nationally and internationally, with the majority being UConn/UCH researchers. Additionally, the CBC offered an independent workshop in the R programming language (<https://www.r-project.org/>), crucial for statistical

analysis and graphical representations. The CBC also provided end-to-end project support for methylation analysis, RNAseq, ATAC-seq, genome assembly, and variant detection. Regular training and bioinformatics support sessions were offered through monthly Data Therapy, virtual/in-person consultations, and continuous real-time support via Slack.

Year Highlights:

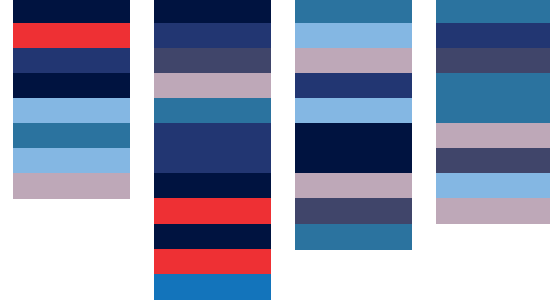
- In collaboration with the HPC core, the new Mantis HPC server is online and available to users with more GPU resources.
- CBC community training: NextFlow developer group formed (Spring 2024).
- CBC Fall journal club focused on pangenome analysis, led by Noah Reid (Fall 2024).
- New concurrent monthly office hours offered at UConn/UCH through Data Therapy Fridays.

CBC Faculty Users: 209 PIs and 1233 total users from a total of 41 UConn academic units (6 Schools and Colleges) plus 12 Centers/Institutes and 2 Core Facilities.

CORE FACILITIES

Single Cell Genomics Center (SCGC)

The Jackson Laboratory (JAX) Single Cell Genomics Center (SCGC) develops and offers single cell capabilities to JAX & UConn investigators. The SCGC provided numerous capabilities in this area including single cell RNA-seq, single nucleus ATAC-seq, spatial transcriptomics, imaging mass cytometry, and, newly added, an organoid screening platform. A total of 17 UConn faculty from 9 academic units (4 Schools/Colleges) were supported by the SCGC.



ISG EDUCATION PROGRAMS

Genetic Counseling Professional Science Master's Degree Program: Preparing the Next Generation of Professionals to Translate Genomics for Health

Congratulations to the inaugural cohort of the Genetic Counseling Master's Degree Program at the University of Connecticut. They have successfully completed their first year and are poised to mentor the incoming class of seven students. The program continues to grow, boasting successful partnerships with 14 clinical rotation sites across Connecticut, Rhode Island, and Massachusetts, and with 40 genetic counselors serving as clinical supervisors for students. UConn's genetic counseling program has garnered national recognition from the American Society for Human Genetics (ASHG) as a model for educational innovation, engagement, and expanding access to the profession. The program was featured in ASHG's Thought Leadership Film Series with a video presentation at the 75th annual conference, which has been viewed nearly 18,000 times. This visibility may have contributed to the 50% increase in applications this past fall.

UConn's Professional Science Master's (PSM) program in genetic counseling remains the only one within a New England state institution and is unique in maintaining a PSM affiliation.

Health Care Genetics Professional Science Master's Program

The continued status of Health Care Genetics as a National Professional Master's Association Affiliated program would not have been possible without the continued contributions of UConn faculty and our external workforce partners who recruit and mentor students. Drs. Sharon Casavant and Christine DiLeone from the School of Nursing were welcomed as major advisors to the Health Care Genetics Program this academic year. New research internships were hosted by Mohan Kocherla, President and Director of Educational Programs at the Center for DNA-Guided Medicine, and Dr. Jean-Denis Beaudoin at his RNA structure, translation, and development lab in UConn Health.

Gratitude should also be extended to program alumni and current graduate students whose accomplishments include outreach, education, and support for incoming and prospective students. We wish congratulations and career success to the following 2023-2024 graduates who have completed the Master of Science Degree in Health Care Genetics.

Allyson Voelker | Kristi Herlth | Ravijot Kaur Aujla | Emma Sykes | Kimberly Joseph

Clinical Genetics and Genomics Graduate Certificate Program

As genetics and genomics rapidly advance and the public grows increasingly aware of personal health risks and genetic factors, it's crucial for healthcare professionals to have a more robust understanding of this specialty. Now in its sixth year, this online graduate certificate program offers an independent yet engaging series of courses. The curriculum is designed and continuously updated to build a strong foundation in clinical genetics and genomics, employing innovative, evidence-based strategies to promote engagement and interactivity within an online asynchronous platform. The program has successfully graduated over 90 students, with an additional 12 students starting this fall. Participants consistently use this program to prepare for graduate school, advance their careers, and pursue various levels of professional development.

Systems Genomics: Clinical Communication and Counseling Graduate Certificate Program

Launched in the spring of 2023, this asynchronous online certificate program is designed to provide foundational concepts within counseling and health communication theories. The program applies counseling concepts in various formats to facilitate effective provider-patient and advocate-consumer communication. Skill development is centered on supporting healthcare discussions and conversations that require the tactful and effective explanation of genetic and genomic information to patients, their families, and consumers. Certificate program graduates include individuals practicing or aspiring to practice in the healthcare field who seek to enhance their communication skills in genomics-related healthcare conversations.

Genomic Data Analysis Online Graduate Certificate

Developed and taught by the faculty at UConn's Computational Biology Core in the Institute of Systems Genomics, the Genomic Data Analysis Online Graduate Certificate program provides an exceptional opportunity for students to gain specialized training in bioinformatics and computational biology without committing to a multi-year full-time graduate degree. The 100% online graduate certificate can be completed in one year.

As the field of genetics and genomics continues to grow rapidly, the demand for individuals who can rigorously and reproducibly extract insight from large 'omic datasets is on the rise. UConn's Genomic Analysis Certificate is designed to equip students with the practical skills and theoretical knowledge to accomplish this. The curriculum consists of four highly interactive, UConn faculty-led online courses introducing students to key concepts in the analysis of genomic data, and provides extensive hands-on experience analyzing high-throughput sequencing data on the UConn Health Center's high performance computing cluster.

Upon completion of the program, students will have the skills to:

- Navigate command line-driven high performance computing infrastructure essential to cutting edge computational biology.
- Execute and interpret common computational workflows in genomics using Linux, R and python-based tools.
- Make those workflows rigorous, reproducible, and portable using Nextflow, git and software containers.
- Communicate results quickly and effectively with text and figures.

Biodiversity and Conservation Genomics Center

The Biodiversity and Conservation Genomics (BCG) Center within the Institute for Systems Genomics (isg.uconn.edu/biodiversity) provides undergraduate and graduate-level training through partnerships with UConn CLAS departments (EEB and MCB). The undergraduate trainees participate in a one-year program to learn to sequence, assemble, and annotate a species (or set of species) of conservation concern.

The training components of the BCG emphasize deeper investigation following the generation of the primary genomic resources. This includes the application of comparative genomics and population genetics, and direct interaction with practitioners engaged in restoration to bridge the conservation genomics gap.

The program accepted its third undergraduate cohort from a large pool of applicants at the beginning of this Summer (2024) (isg.uconn.edu/biodiversity/members). Since the program's inception in 2022, 13 students have been trained. Five of these trainees, who were not graduating seniors when they entered the program, served as trainers for the next cohort. All non-graduating seniors have also applied for and received independent funding to continue their research into the next summer through UConn's Office of Undergraduate Research SURF program (isg.uconn.edu/conservation_funding).

The graduate students supported by the BCG

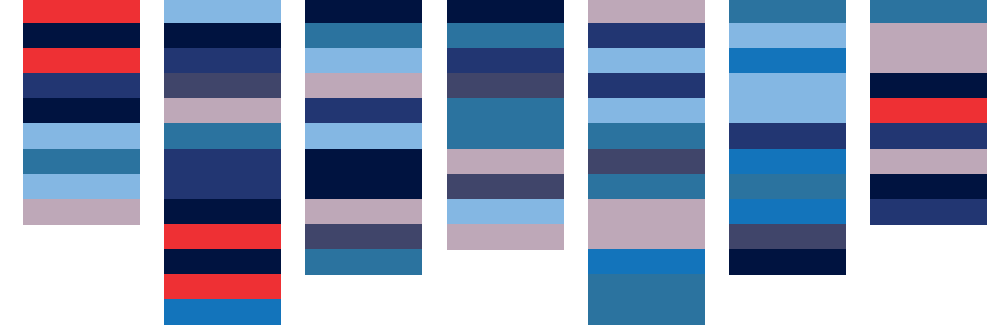


program, in collaboration with the Computational Biology Core, develop scalable and reproducible software that facilitates genome assembly and annotation. Furthermore, they serve as mentors to the undergraduate students, guiding them through intensive training sessions spanning the academic year and summers. Together, they engage in research activities focused on threatened species, encompassing genome assembly/annotation, variant detection, and population genetics/landscape genetics (isg.uconn.edu/software).

The collaborative approach enables the application of cutting-edge genomic techniques in real-world conservation efforts. A significant aspect of the program involves a collaboration with Oxford Nanopore's Org.one program that provides partial support for sequencing IUCN Red List species, particularly those listed as endangered. Through the Org.one program, the ISG and BCG have provided the first genomic resources for over 30 species of birds, amphibians, mammals, and plants. This collaboration is reinforced by recommendations published by the EarthBioGenome Project, an international consortium, with membership that includes UConn. Existing and new partnerships with federal/state agencies, and NGOs (CT DEEP, US Forest Service, aquariums, zoos, arboretums, and botanical collections) provide opportunities to implement genomic tools in management (isg.uconn.edu/genome_projects).

In addition to successes in undergraduate and graduate-level training, the program has hosted

several invited speakers, developed collaborations with external organizations, and received international attention through joint publication by the undergraduate cohort on genomes of conservation concern and an international session on the Org.one program at the Plant and Animal Genome Conference. Finally, the program has directly delivered genomic tools to federal practitioners involved in forest tree restoration.



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INSTITUTE FOR SYSTEMS GENOMICS LEADERSHIP

- **Jill Wegrzyn** (EEB, Director of Computational Biology Core)
- **Rachel O'Neill** (MCB, Director of ISG)
- **Nicole Pauloski** (MCB and ISG - ONT Sequencing)
- **Noah Reid** (CBC Core - Nextflow Training)

MENTORS AND TRAINERS (2023-2024)

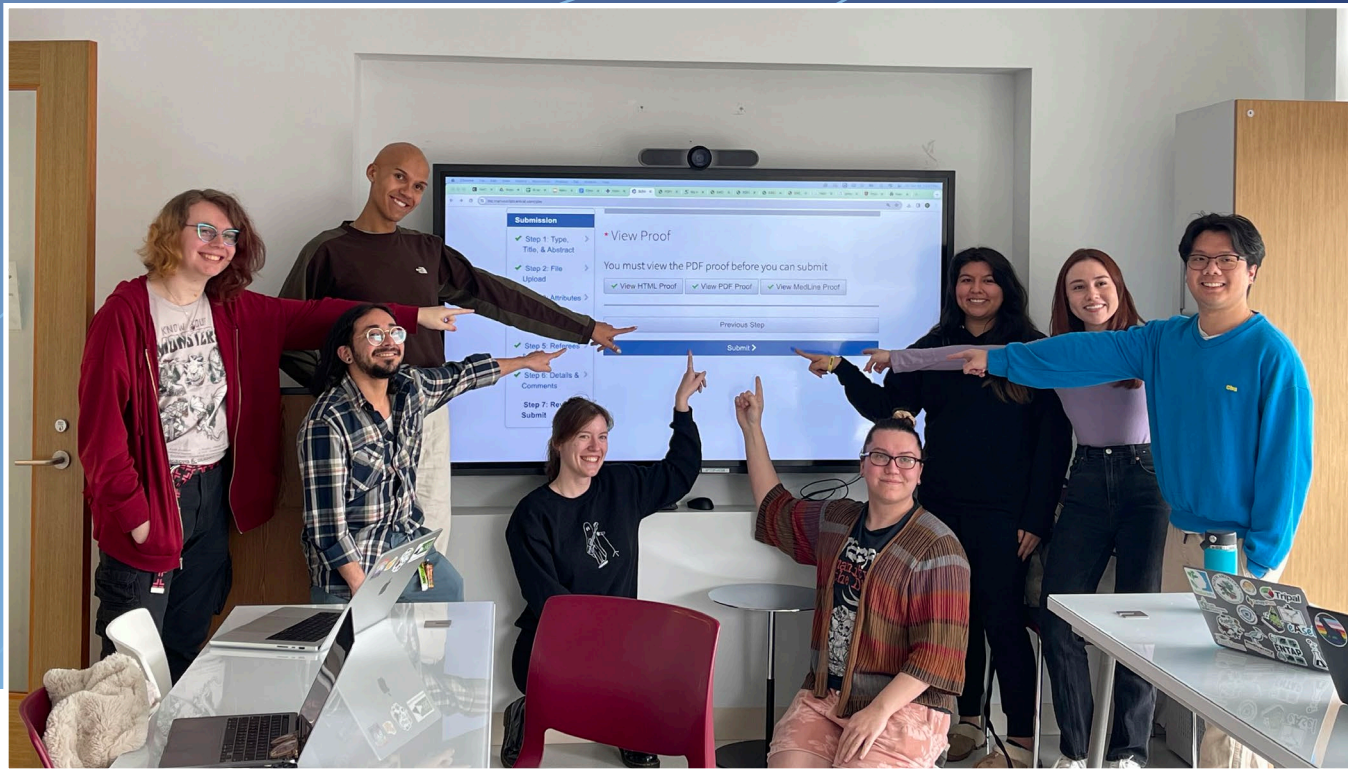
Graduate Student Mentors: Michelle Neitzey (Molecular and Cell Biology), Cynthia Webster (Ecology and Evolutionary Biology). Postdoctoral mentor: Karl Fetter (Ecology and Evolutionary Biology). Undergraduate Mentors: Chris Guzman (Ecology and Evolutionary Biology), Emily Trybulec, Emily Strickland, Harshita Akella (Molecular and Cell Biology).

STUDENT COHORT (2023-2024)

Amanda Mueller, David Baukus, Anthony He**, Keertana Chagari** (Molecular and Cell Biology), Laurel Humphrey (Ecology and Evolutionary Biology), Owen McEwing (Biology), Stefan Wnuk (Custom: Bioinformatics).

**SURF Awardee - Summer 2024





RaMP

UConn RaMP (Research and Mentoring for Postbaccalaureates) is a yearlong, National Science Foundation (NSF)-funded research training program for recent graduates, primarily from underrepresented groups in STEM. The Program is led by Elizabeth Jockusch and Teisha King from the Ecology and Evolutionary Biology (EEB) department and the ISG provides the home base for the program.

The first cohort of 8 RaMP scholars arrived at UConn in August 2023 from as far away as Kansas and Puerto Rico. They spent their first month together at the ISG learning a combination of wet lab and bioinformatics skills. They also began work on a collaborative research project to sequence, assemble, and annotate an organism's genome. This year's combined success resulted in a manuscript published in the May 2024 edition of *Genome and Biology Evolution*. The manuscript describes the genome of the desert scorpion, *Hadrurus arizonensis*, the first assembly from the family Hadruridae and the first chromosome scale genome across scorpions.

2023 RaMP scholars submitting their first manuscript along with graduate student mentor, Cynthia Webster.

“Unveiling the Genetic Blueprint of a Desert Scorpion: A Chromosome-level Genome of *Hadrurus arizonensis* Provides the First Reference for *Parvorder Iurida*”, May 2024, *Meridia* Jane Bryant*, Asher M Coello*, A M Glendening*, Samuel A Hilliman*, Carolina Fernanda Jara*, Samuel S Pring*, Aviel Rodríguez Rivera*, Jennifer Santiago Membreño*, Lisa Nigro, Nicole Pauloski, Matthew R Graham, Teisha King, Elizabeth L Jockusch, Rachel J O’Neill, Jill L Wegrzyn, Carlos E Santibáñez-López, Cynthia N Webster *Genome Biology and Evolution*, Volume 16, Issue 5, evae097, <https://doi.org/10.1093/gbe/evae097> Today, scholars are working towards completing their second manuscript, a comparative analysis across arachnids (scorpions, spiders, ticks, and mites) focusing on methylation patterns, expansions and contraction of gene families, and genomic repeats. RaMP scholars also conduct independent research in labs across the EEB, Molecular and Cellular Biology (MCB) and Physiology and Neurobiology (PNB) departments in

the College of Liberal Arts and Science (CLAS). In addition to research, scholars participated in several professional development and community building activities including:

- Workshops on career readiness, scientific writing, and science communication.
- Attended (and presented) at academic conferences and networking events.
- Tours of Jackson Laboratory in Farmington, CT and the Mystic Aquarium in Mystic, CT.

The 2023 cohort will conclude the year by presenting their research at RaMP’s end of year conference and the international Evolution Conference in Montreal, QC, Canada.

In August 2024, RaMP will happily welcome the next generation of scholars, the 2024 cohort, as they begin their “bridge to research”. The group of eleven scholars will participate in a preliminary training program designed to help scholars develop fundamental research skills like pipetting, PCR, molecular cloning, how to read search academic literature and bioinformatics (led by ISG’s K. Castellano and R. O’Neill, and EEB’s J. Wegrzyn, E. Jockusch, and T. King).

Follow @uconnramp on X (formerly Twitter) and Instagram or visit the website for more information on the RaMP program.

**RaMP Scholar*

iGEM

Members of the UConn iGEM (international Genetically Engineered Machine) group had a busy year of project implementation, teaching, and outreach activities. Students started the fall 2023 semester excited to continue their project of designing a bacterium that can efficiently degrade synthetic estrogen (EE2). EE2 is a common pharmaceutical in wastewater which is only partially degraded during the wastewater

treatment processes and can have negative consequences to aquatic wildlife. The UConn team presented this project at the world’s largest synthetic biology competition in November 2023 receiving a bronze medal.

In May, the 2024 summer team began their new project creating a fast and cost effective method for detecting harmful algal blooms (HABs). HABs arise when rapid overgrowth of algae that produce toxins occurs in either fresh or marine environments, impacting humans, fish, shellfish, marine mammals and

birds. The iGEM team is interested in creating a detection method to identify the specific toxin, Saxitoxin, a neurotoxin which can accumulate in shellfish and cause paralytic shellfish poisoning (PSP).

TRAINING THE NEXT GENERATION OF iGEM RESEARCHERS

While motivated to work on their project, the iGEM students were even more excited to have new members join them in the ISG lab. After bringing new members up to speed on the



iGEM hard at work in the lab. L to R: Mariella Petrovic, Alyna Beardslee, Jada Gist and Mahathi Veluri.

organization in general body meetings, they also provided basic molecular lab training. During the spring 2024 semester, senior iGEM students led weekly lab sessions supporting the growth of iGEM members in the lab where they learned advanced molecular techniques and applied them to the Estro project. In June, students will participate in a workshop and networking event with local science entrepreneurs and CEOs through the UConn Technology Innovation Program (TIP).

OUTREACH ACTIVITIES

In addition to broadening the skills of its UConn undergraduate members, the UConn iGEM group leads outreach activities in the community. They have visited 2 high schools providing lab demos and discussions on future careers. They have hosted 2 events at the Willimantic Library where they taught students about DNA and how to extract it using common household items. iGEM also welcomed the EO Smith Science Club on campus for a tour and a presentation about their experience in iGEM and current research. Additionally, the iGEM team joined the Genome Ambassadors and Project Limulus to tag Horse Crabs in the Long Island Sound and assist with field surveys.

SUMMER 2023 FELLOWSHIP RECIPIENTS

Congratulations to the 2024 summer fellowship recipients: Alyna Beardslee (Molecular and Cell Biology and Diagnostic Genetics Sciences, 2026), Jada Gist (Marine Science, 2027), Mariella Petrovic (Molecular and Cell Biology, 2026), and Mahathi Veluri (Molecular and Cell Biology, 2027). The students will implement a large part of the experimental and computational work on the HAB detection project this summer and highlighting their activities to the rest of the UConn iGEM group via web video meetings. They will also receive mentoring from our first Industry partner, Shelly Wanamaker Ph.D., from the Gloucester Marine Genomics Institute along with their faculty advisor, Kate Castellano. When UConn iGEM members return this fall, everyone will be busy completing the project to present at UConn's Fall Frontiers.

IGEM LEADERSHIP TEAM

Co-Presidents

Srishti Tandon

Molecular and Cell Biology, 2026

Mehr Chhatre

Chemical Engineering, 2026

Treasurer

Rakshan Chadha

Molecular and Cell Biology, 2027

Secretary

Alveena Ehsan

Biomedical Engineering, 2027

Wet Lab Chair

Sophia Simmarano

Molecular and Cell Biology, 2027

Dry Lab Chair

Paris Bazemore

Biomedical Engineering, 2027

Education Chair

Nathan Shaw

Biological Sciences, 2025

Community Outreach Chair

Emma Hazard

Allied Health Sciences, 2027

To keep up with the iGEM's activities and research progress, follow @uconnigem on social media!

Genome Ambassadors: An Educational Outreach Initiative Increasing Access, Advancements, and Inclusion in Genomics

The Genome Ambassador Program (GAP) provides virtual and in-person educational programming for learners in grades 6-12 about genetic science topics, with hands-on laboratory experiments, interactive classroom activities, and inspiring career pathway conversations.

PROFESSIONAL DEVELOPMENT

GAP members hosted 3 Career Readiness Seminars as part of the "Bridging the GAP" professional development seminar series. Drawing students from diverse disciplines, the series is an interactive, UConn Career Champion and Honors-supported event to spotlight careers in the life sciences. Attendees met professionals from



the Down Syndrome Association of Connecticut, Friedrich's Ataxia Research Foundation and Cystic Fibrosis Foundation, and learned how to integrate advocacy into professional roles in the field of genetics.

STUDENT & COMMUNITY SUPPORT

The Genome Ambassadors participated in many outreach events in Spring 2024. In March, the Ambassadors visited Old Saybrook High School for a career panel called "What can I do with genetics?" Forty sophomores and juniors attended this event. In May, the Ambassadors participated in the 4th annual Dr. Craig Yennie Stem Day at the Sports and Medical Sciences Academy in Hartford with the goal of presenting tangible examples of STEM careers right here in CT. GAP performed a "taste your genes" activity

allowing students to test whether they have the dominant allele for bitter taste. About 200 5th-12th graders participated in this event. In collaboration with Project Limulus, the Ambassadors hosted a Horseshoe Crab tagging event in June where participants learned how to survey and tag Horseshoe crabs for population surveying. The goal of this event was to raise awareness around Horseshoe Crab population declines and the importance of utilizing multiple scientific fields for conservation including genomics, ecology, demography and taxonomy.

Sponsorship of GAP activities and events with goals of progressing the genomics field towards achieving greater diversity is graciously welcomed. To keep up with the GAP's activities and events, follow @uconngap on social media!

NEW MEMBERS



Laijun Lai

Research Professor, Department of Allied Health Sciences, UConn

The research projects in Dr. Lai's laboratory include 1) using bioinformatics to identify new immune checkpoint molecules and then employing gene engineering to produce the recombinant proteins and antibodies to treat cancer and autoimmune disease, 2) employing embryonic stem cell (ESC)- and induced pluripotent stem cells (iPSC)-derived cells to model and treat immunodeficiency and autoimmune disease, and 3) using a gene engineering approach to produce recombinant proteins to treat T cell immunodeficiency in older adults.



Kendra Maas

Facility Director, Microbial Analysis, Resources and Service, UConn

Dr. Maas is the Facility Director of the Microbial Analysis, Resources and Services (MARS) facility, supporting the UConn research community specializing in the analysis of microbial samples and high-throughput processing of nucleic acids. Examples include the characterization of microbiomes (Bacterial V4, Bacterial EMP, Fungal ITS, or custom amplicon), sequencing of small genomes, 96-well and 384-well PCR setup or DNA quantification and other automated liquid handling applications. Services are available a la carte, ranging from fee-for-service to unassisted use of the equipment by trained and certified users.



Pedro Miura

Associate Professor, Genetics and Genome Sciences, UConn Health

Dr. Miura's laboratory is interested in the transcriptome of neurons. They use RNA sequencing approaches to understand the exonic content and regulation of full-length transcripts. A particular focus of our group is understanding cross-regulation between Alternative Splicing and alternative cleavage and polyadenylation (APA). Using genome editing approaches we interrogate the molecular and physiological roles of alternative transcript isoforms using *Drosophila melanogaster* and mammalian neural differentiation cell culture models.

NEW ISG POSTDOCTORAL FELLOW MEMBERS:

Georgia Doing, Patrick Grady, Gabrielle Hartley, Nicole Tillquist

NEW GRADUATE STUDENT MEMBERS:

Yetunde Akinlaja, Katelyn Denegre, Katherine Fleck, Lucas Jones, Shania Kalladanthiyil, Mengjia Lin, Rachael Massey, Michelle Neitzey, Sean Riccard, Akshada Shankar Ganesh, Kaylah Samuelson, Cynthia Webster

STUDENT SPOTLIGHTS

Congratulations to the AY '22-23 recipients of the The Kenneth and Paula Munson Family Fund for Student Support in Health Science Fellowship:



Yetunde Akinlaja
PH.D. CANDIDATE, DEPARTMENT OF
PHYSIOLOGY AND NEUROBIOLOGY

Yetunde's research explores the signaling between activated neurons and the surrounding glial cells.



Kate Denegre
PH.D. CANDIDATE, DEPARTMENT OF
MOLECULAR AND CELL BIOLOGY

Kate's research involves the Transgenerational Epigenetic effects occurring in the Autism Spectrum Disorder.



Nadine Lebek
PH.D. CANDIDATE, DEPARTMENT OF
MOLECULAR AND CELL BIOLOGY

Nadine's research explores gene expression, cellular protein homeostasis, and neurodegenerative diseases.



Rachael Massey
PH.D. CANDIDATE,
BIOMEDICAL SCIENCE

Rachel's research involves the genetics, and developmental consequences behind Turner syndrome.



Weizi Wu
PH.D. CANDIDATE,
SCHOOL OF NURSING

Weizi is studying the mechanisms of chemotherapy-related symptoms using a bio-behavioral approach. Specifically, she is interested in understanding the genetic contributions to chemotherapy-related fatigue.



Yiming Zhang
PH.D. CANDIDATE, COMPUTER
SCIENCE AND ENGINEERING

Yiming's current work is focused on genetic testing related methodology development, especially ancestry inference.

Thank you to our donors for their generous contribution for this scholarship program.

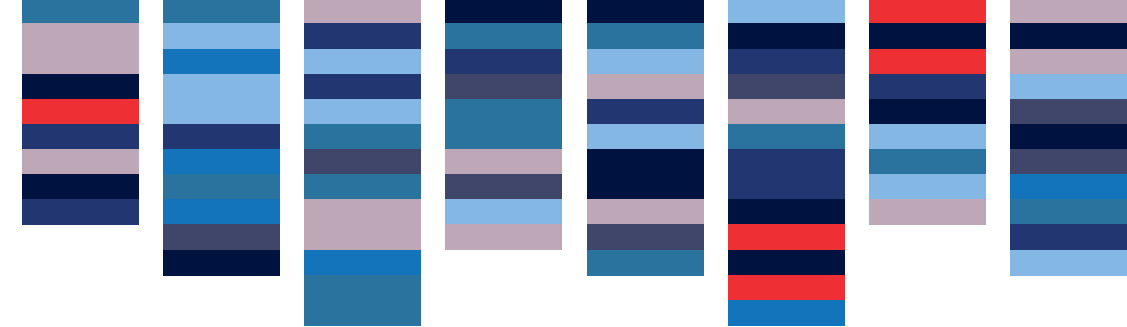
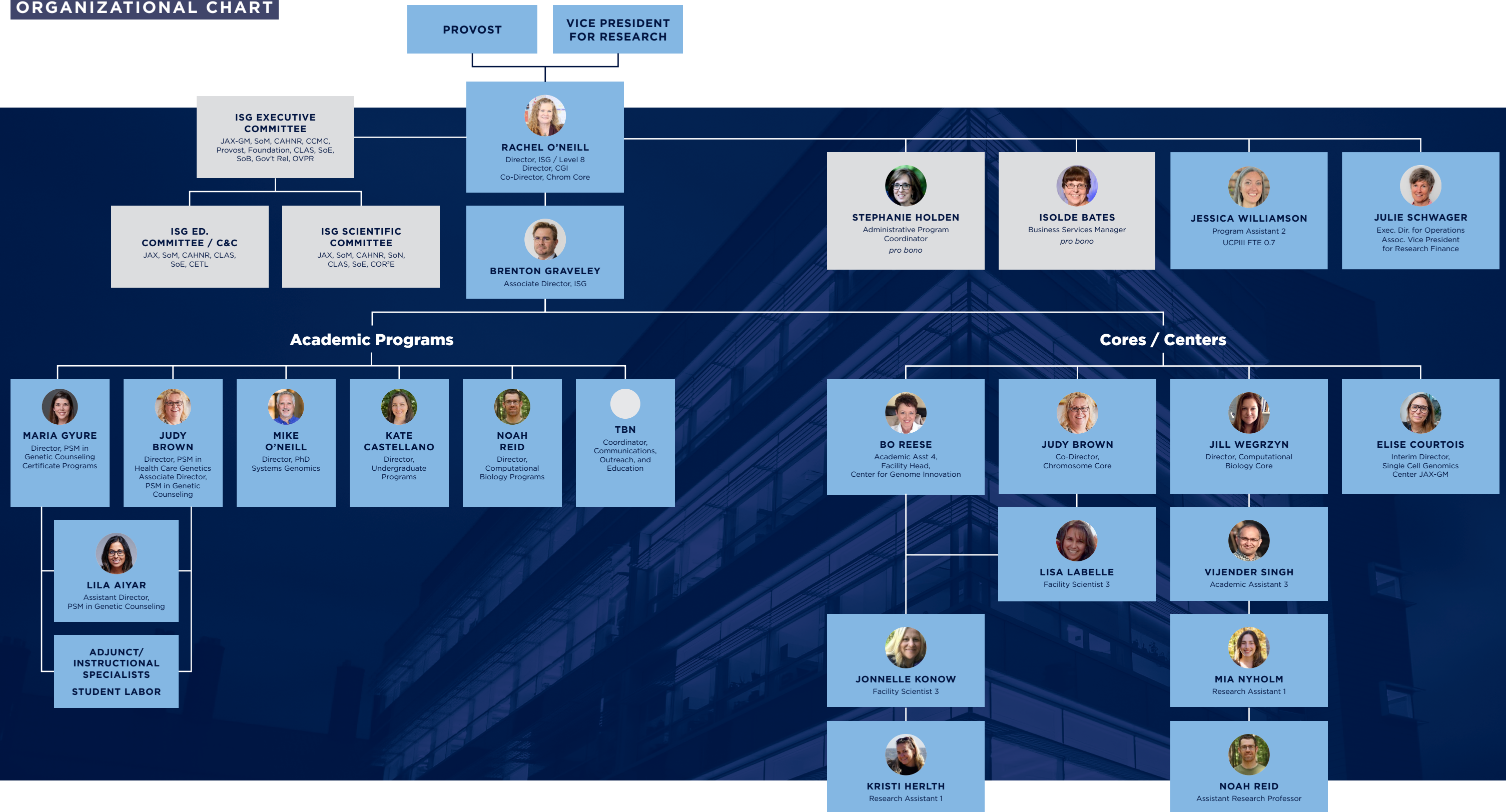
Networking Events

The ISG, in collaboration with the School of Pharmacy, hosted a Boehringer Ingelheim Career Networking Event on April 25th for over 50 Postdocs and Ph.D. students interested in pursuing a career in the pharmacy industry.

The ISG offers seminars, networking, workshop, and training opportunities with over 100 events to date. Visit our website for the complete schedule of events: isg.uconn.edu/seminars-workshops

Institute for Systems Genomics

ORGANIZATIONAL CHART





**INSTITUTE FOR
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You can make an impact on the advancement of genomics research at UConn. Your gift will provide support for research innovations and discoveries, scholarships, and community outreach programs in the Institute for Systems Genomics. If you feel called to give, please visit:

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Join

With the aim to integrate genomics research and education across The Jackson Laboratory and UConn campuses as well as affiliated teaching hospitals, the ISG welcomes new faculty, postdocs and graduate students.

ISG.UCONN.EDU/JOIN

Engage

The ISG offers seminars, networking, workshops, and training opportunities. Visit our website for the complete schedule of events.

ISG.UCONN.EDU/SEMINARS-WORKSHOPS

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