INSTITUTE FOR SYSTEMS GENOMICS NEWSLETTER
February 2017

Computational Biology Core

Expanding the CBC Team! Two new members have recently joined the CBC team.

Vijender Singh is our new lead bioinformatics scientist. He comes to us with several years experience in genomics and bioinformatics from the Center of Gene Regulation and Expression at the University of Dundee.

Neranjan Perera joined us as a postdoctoral scholar. He recently obtained his PhD in Chemistry here at UConn and trained in the CBC for one year before joining.

The Computational Biology Core will be hosting an Open House on **Friday, February 24, from 9:30am-4:30pm in the Cell and Genome Sciences Building, 400 Farmington Avenue, Farmington, CT**. The full day event will provide information on our new hardware capabilities, software offerings/training, research talks, and details on the types of support provided by our team. Lunch will be provided, as well as shuttle transport from Storrs to UCH. Link to tentative schedule and registration for the event.

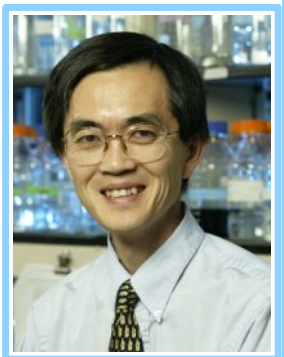
SAVE THE DATE
ISG 5th Anniversary Celebration

The University of Connecticut Institute for Systems Genomics (ISG) will be celebrating it's 5 year anniversary on **Wednesday, November 8, 2017** in Storrs, Connecticut. The ISG was established with a mission of promoting world-class research and training in genomics and personalized medicine, and to enhance our partnership with The Jackson Laboratory for Genomic Medicine. Our 5 year anniversary coincides with the launch of the Engineering and Science Building on the Storrs campus, in which the ISG will occupy two floors of this new building

The celebration will include presentations by:

- **Mark Gerstein**, Yale University
- **Eric Green**, Director, National Human Genome Research Institute
- **Brenton Graveley**, UConn School of Medicine
- **Charles Lee**, The Jackson Laboratory for Genomic Medicine
- **Rachel O'Neill**, University of Connecticut

For more information on the celebration, please contact Stephanie Holden at sholden@uchc.edu



National Academy of Science member, **Se-Jin Lee, M.D., Ph.D.**, will join the faculties of the University of Connecticut School of Medicine and The Jackson Laboratory as Presidential Distinguished Professor this summer. Dr. Lee is world-renowned for discovering myostatin a protein that blocks muscle growth. The long term goal of his research is to attempt to exploit the biological properties of myostatin in order to develop novel therapeutic strategies for treating patients with muscle degenerative and wasting conditions, such as muscular dystrophy, sarcopenia, and cachexia resulting from diseases like cancer, AIDS, and sepsis.

Engineering and Science Building

Architect's rendering of the new Engineering and Science Building.

The new Engineering and Science Building (ESB) is on schedule to be completed in June 2017. Two floors of the five-story building will be dedicated to the Institute for Systems Genomics, including the Center for Genome Innovation, the Chromosome Core, and the Computational Biology Core. The collaborative space will also house laboratory space for faculty members from the Departments of Molecular and Cellular Biology, of Ecology and Evolutionary Biology, of Allied Health Sciences and of Genetics and Genome Sciences. These investigators will also interact closely with computational scientists from the School of Engineering

Latest UConn ESB construction update video: (construction project video)

Largest Genome Sequenced to Date

UConn researcher, **Jill Wegrzyn**, is part of the team that deciphered the largest genome sequenced and assembled to date - the sugar pine tree. Sugar pines, the world's largest species, are dying from white pine blister rust, a non-native invasive fungus (read more).

Sequencing the entire genome was a tremendous feat that will allow researchers to develop an effective method to fight against the white pine blister rust.

The study was published, and featured on the cover, of the December issue of *GENETICS*, along with a companion paper published in *G3: Genes, Genomes, Genetics*.

The Sugar Pine, the world's largest pine, is being threatened by an invasive fungus known as white pine blister rust.

The Impact of CRISPR on Imprinting Disorders

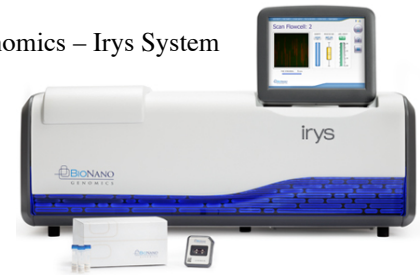
The Health Care Genetics Professional Science Master Degree Program and the Institute for Systems Genomics are hosting a series of presentations for researchers, diagnostic scientists, counselors, and physicians on the field of imprinting and imprinting disorders. Researchers will review mechanisms of imprinting in human disease and the basics of the exciting new technology clustered regularly interspaced short palindromic repeats (CRISPR) and its use in induced pluripotent stem cells (iPSC). The event will be held on **Saturday, April 1, 2017** (no Aprils Fool) on the UConn Storrs campus (see attached flyer).

Center for Genome Innovation

The CGI has added new equipment and new services to our portfolio this year. We have acquired the Bionano Irys platform, capable of detecting structural variants and hybrid scaffolding for genome assemblies. The Irys is not a next generation sequencing platform, but performs long range optical mapping at ultra-high resolution using nanochannel arrays.

The CGI has added new services, including RAD-seq and Sanger sequencing. To support faculty in meeting the Key Biological Sample Authentication requirements of the NIH, we now offer STR typing in addition to our existing karyotyping services.

BioNano Genomics – Irys System



Single Cell Facility

The Chromium System (10X Genomics) was installed in the facility. This is a commercial droplet-based single cell transcriptome profiling system that permits the profiling of thousands of individual cells at a time. Many ISG users from JAX, UCHC, and UConn (Storrs) are taking advantage of this system. In addition, we have developed a data visualization and mining tool (CellView) that makes such data accessible to the biologist untrained in computational techniques.

Chromium 10X Genomics

In December 2016, the facility also installed a laser ablation module upstream of the CyTOF mass cytometer (Fluidigm), combined this comprises an imaging mass cytometry (IMC) unit.

Computational Biology Core (continued)

Starting Friday, February 3rd: Group *Data Therapy* Sessions - CBC offers hour long sessions every other Friday at 10:00AM. We welcome beginners and advanced users to generate a productive discussion. To get an idea of the group size (and your general interests) – we have a very quick survey.

Bioinformatics Summer Workshops: New CBC training workshops will be offered this summer. These are offered as 2 or 3 full days (depending on the topic and level). Courses range in cost from $500-$700 and are open to undergraduates, graduate students, postdocs, and faculty. We will offering an RNA-Seq course this April and want to hear from you on other topics of interest! Each class enrolls a maximum of 10 students and provides hands-on training and background for genomics data analysis. Use the following survey to tell us about the training you or your group members need.

Need support? Starting a new project or have one on the horizon? Need consultation, hardware access, or a piece of software installed on the cluster? Fill out account request/support form: http://bioinformatics.uconn.edu/contact-us/

High Performance Computing Infrastructure

Special thanks goes out to **Dr. Michael Mundrane**, Vice Provost for Information Technology and Chief Information Officer, for his continued efforts over the last few months to add capacity to our existing data storage. A $271,000 data storage capacity increase upgrade was awarded through UConn's Academic Vision.

PSM PROFESSIONAL SCIENCE MASTER'S

Genetic and Genomic Counseling

The ISG was awarded a grant by the University for their academic plan proposal to establish a Professional Sciences Master's Program in Genetic and Genomic Counseling. The interdisciplinary, accredited PSM in Genetic and Genomic Counseling will train professionals in genetics, epidemiology, and counseling theory with skills in risk assessment, education, and counseling to explain test complexity to clients who are afflicted with or are at risk of disease. This innovative Program will be established under the auspices of the ISG, its affiliated UConn Departments and teaching hospitals, and the Jackson Laboratory for Genomic Medicine.

Computational Biology Core (continued)

Upcoming proposal? Request a letter from the CBC, the Center for Genome Innovation and/or the new Proteomics Core: http://bioinformatics.uconn.edu/contact-us/letter-of-support-for-proposal-request/

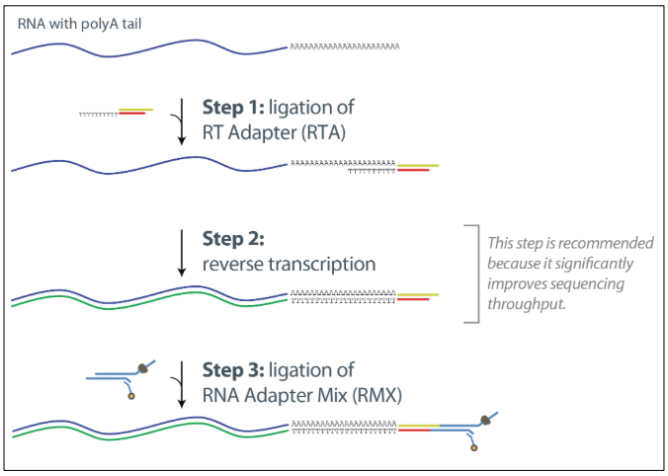
Recently published a manuscript that benefitted from support or hardware at the CBC? Please tell us! http://bioinformatics.uconn.edu/add-grantpublication/

Want help from the comfort of your office? Ping us on our new **Slack** channel. Anyone with a uconn.edu or uchc.edu address can join #bioinformatics_help using (**uconn-cbc.slack.com)**

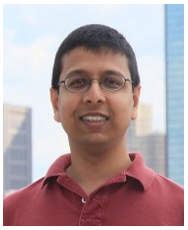
Keep Connected/Updated! Follow us on Twitter @UConn_Bioinfo

RNA finally getting into the groove!

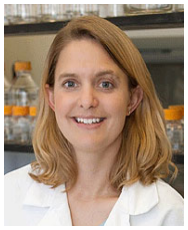
The laboratory of **Brenton Graveley** was selected as an alpha test site for Oxford Nanopores new direct RNA sequencing method using the MinION sequencer. At long last, it is now possible to sequence RNA directly, rather than a DNA copy of the RNA. This new method will transform the study of RNA biology, in particular, the ability to study RNA modifications.



ISG Faculty Spotlight:

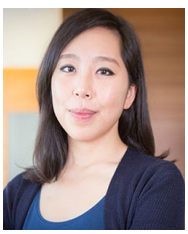


Congratulations to **Mukul Bansal**, assistant professor of computer science and engineering, on his multiple grant awards from the National Science Foundation in 2016. These awards will support the development of new computational methods and algorithms in computational phylogenetics and comparative genomics. Of the three awards, one is concerned with the algorithmics of inferring domain-level changes in proteins, one with understanding microbial evolution through horizontal gene transfer, and one with more accurate time-calibration of the tree of life. Dr. Bansal is also co-PI on a grant related to inferring disease transmission networks.



Stormy Chamberlain, assistant professor of genetics and genome sciences, has been named the new Scientific Advisory Committee Chair for the Angelman Syndrome (AS) Foundation. Dr. Chamberlain is an AS pioneer and is well known for studying unique ways to activate paternal UBE3A as well as using human stem cell models to study AS (link to article).

Congratulations to **Barbara Mellone**, associate professor of Molecular and Cell Biology, on her 2016 Women in Cell Biology Junior Award for Excellence in Research from the American Society for Cell Biology. Dr. Mellone received this award for her excellence in research on the mechanisms of centromere specification (link to article).



Julia Oh, assistant professor, has been awarded an American Cancer Society grant to investigate the relationship between the skin microbiome and cutaneous squamous cell carcinoma (cSCC). Dr. Oh has established collaborations with the UConn Dermatology Department with hopes of using patient samples for atopic dermatitis and other skin diseases as she investigates how the skin microbiome affects cSCC.

Yijun Ruan, professor, has been awarded a $6.7 million grant from the National Human Genome Research Institute to launch a center for the three-dimensional (3-D) mapping of the human and mouse genomes. This research will help expand the ENCyclopedia Of DNA Elements (ENCODE), a comprehensive catalog of functional elements used to study human health and disease. (link to article)

Faculty Candidate Seminars for Animal Genomics position:

The Department of Animal Science in the College of Agriculture, Health, and Natural Resources have invited the following four candidates to interview for the animal genomics faculty position.

Date of Visit	Faculty candidate
February 20-21, 2017	**Dr. Yanghua He**, Postdoctoral Associate, University of Maryland, Department of Animal and Avian Sciences
February 23-24, 2017	**Dr. Maria Hoffman**, Postdoctoral Fellow, University of Connecticut, Department of Animal Science
February 27-28, 2017	**Dr. Jianbin Wang**, Research Assistant Professor, University of Colorado School of Medicine, Biochemistry and Molecular Genetics
March 1-2, 2017	**Dr. Zongliang Jiang**, Postdoctoral Associate, Yale University School of Medicine, Department of Obstetrics, Gynecology & Reproductive Sciences

The department is currently working with the candidates to collect seminar titles and determine times for their talks; seminar flyers will be distributed soon. If you are interested in meeting with the candidates, please contact Jennifer Simoniello at jennifer.simoniello@uconn.edu.