

WHAT'S NEW FOR RU RESOURCE CENTERS – FY19

The Rockefeller University Resource Centers continued to support our scientific community with expert staff, cutting edge equipment and services in fiscal year 19. The Resource Center Staff continued to conduct applied research to improve techniques and methodologies and fine tune services to meet researchers' changing needs.

This year, the University invested significant resources to strengthen and advance its genomic sequencing capabilities by acquiring an **Illumina Novaseq 6000**. This system is the most powerful high-throughput Illumina sequencing system to date. Applications requiring large amounts of data, such as human whole-genome sequencing (WGS), ultra-deep whole exome sequencing, single cell sequencing, and tumor-normal profiling can be completed in a faster and more cost-effective manner. For the most commonly conducted sequencing done by University researchers, this new platform will reduce overall sequencing costs by approximately 50%.



Illumina Novaseq 6000



Director of the EMRC The University recruited **Dr. Hilda Amalia Pasolli** as the new **Director of the Electron Microscopy Resource Center**. Amalia was a Research Associate Professor in the Fuchs Laboratory from 2002 to 2014. Dr. Pasolli rejoins the University after five years as Senior Scientist of the Electron Microscopy Shared Resource at HHMI's Janelia Research Campus.

Hilda Amalia Pasolli

Fabrication Synergy The Precision Fabrication Facility and the Instrument Design and Fabrication Facility are now combined under a single name, **Precision Instrumentation Technologies (PIT)**. The new facility name reflects the intent and reality of the synergy between the makerspace (PFF) and professional engineering operations (IDFF). "The co-localization and establishment of the PIT further boost the University's instrument design and fabrication capabilities," says Amy Wilkerson, Associate Vice President of Research Support. The combination and renaming of "The PIT" was announced to the RU community in the October 26, 2018, publication of *Campus News*, and was referenced in The Rockefeller University's 2018 Annual Report.

Enabling Cryo-Tomography Studies The Evelyn Gruss Lipper CryoEM Resource Center (CEMRC) recently installed a **Thermo Fisher Aquilos Cryo Focused Ion Beam system (Cryo-FIB)**, used to prepare samples for cryo-tomography studies. The instrument was purchased through a HHMI Transformative Technology 2019 award to Rod MacKinnon. The Cryo-FIB will be managed by the CEMRC. Staff will advise, train, consult and collaborate on research projects with scientists from the University in support of cryo-transmission electron microscopy (TEM) and cryo-electron tomography applications.



ThermoFisher Aquilos

EQUIPMENT

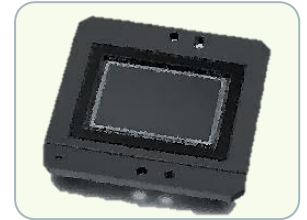
Added to the Bio-Imaging Resource Center:



The **Caliber ID Resonant Scanning Confocal Microscope (Caliber ID RS-G4)** has the capability to collect high-quality confocal images of large biological samples (up to 120mm) in a fraction of the time that conventional confocal microscopes require.

Available in the Electron Microscopy Resource Center:

Biosprint 29 CCD camera for the Tecnai - The **Biosprint 29 CCD Camera** for TEM creates large 16 megapixel images with high definition and resolution using the highly corrected ActiveVu-lens by AMT.



Newly Available in the Proteomics Resource Center:

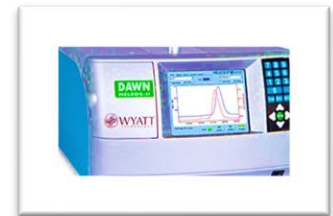
The **Waters LC-MS** is an additional high resolution/high mass accuracy LC-MS/MS platform for metabolomics. The system is designed to fractionate molecules based on liquid chromatography. The system includes a mass spectrometer that allows fractionation based on predefined nominal masses of expected molecules.



Available in the Structural Biology Resource Center:

The **BioRad NGC Quest10+ FPLC** provides accurate gradients for high resolution separation of proteins and biomolecules with its automated 10 ml/min pumps. It provides the purification of biomolecules and simultaneous detection of proteins, peptides, nucleic acids and other chromogenic molecules.

The **Agilent/Wyatt SEC-MALS**, a donation from the Blobel Laboratory, is used to determine absolute molecular weight and oligomeric state of macromolecules using infrared and light scattering techniques.



Upgrade at Glasswashing:

The University replaced an older unit with a **Reliance 400XLS Laboratory Glassware Washer** that requires shorter cycles that allow for greater efficiency. A second Reliance 400XLS will be added in FY20.

- **The CryoEM Resource Center** added **two new GPUs** to the **Artica** and the **Krios** in support of a data processing pipeline that includes a user-friendly graphical interface.
- **The High Performance Computing Facility** expanded the compute cluster, adding **489 TB of usable storage and 1,024 cores in 31 compute nodes** provided by the Reference Genome Resource Center to support the new PacBio sequencers.
- **The High Throughput and Screening Resource Center** has acquired an **Applied Photophysics Chriascan V-100 Circular Dichroism Instrument** and a **Nanotemper Dianthus NT2.3 pico Instrument**.
- **The Reference Genome Resource Center** (formerly known as the Vertebrate Genome Laboratory) added **two new Pac Bio sequencers**. These instruments provide high-molecular weight DNA and long-read genomic technologies available to University researchers, in addition to their use for whole genome *de novo* sequencing for the Vertebrate Genome Project.

MAKING AN IMPACT

Acknowledgement of the Centers ensures that the University meets contractual obligations to funding agencies, strengthens the reputation of the Centers and increases the competitiveness of grant applications that reference use of the Centers. In FY19, at least **51 published articles** included Resource Center staff as **co-authors** and more than **175 articles acknowledged** use of one or more Resource Center.

Education and Outreach

The heads of all the Centers participated in the orientation for first year Graduate Students on September 7, 2018, to introduce them to the support, services, training and consultative services available from the Centers. • The Office of Research Support ran the 15th annual Scientific Resource Center Presentation Series from January to July 2019. The Resource Center heads each presented an overview of their Center's services. These presentations also include reports on results obtained by Center users, information on new trends and technologies and case studies. • The **BIRC** and **CEMRC** sponsored tours for *Science Saturday*, on Saturday, May 4, 2019.

On and Off Campus Lectures

BIRC • **North, A.**, "A Voyage into an Invisible World: How Modern Microscopes are Transforming Science," Women & Science lecture, The Rockefeller University, *March 6, 2019*. • **North A.**, Light microscopy meeting "Pushing the limits of biological imaging," the North Atlantic Microscopy Society (NAMS) held at the Rockefeller University on *April 24, 2019*. **GRC** • **Zhao, C.**, hosted Illumina Seminar, "Hot Topics in Next Generation Sequencing," with Britt Flaherty, PhD, Executive Sequencing Specialist on *October 23, 2018* **FCRC** • **S. Mazel**, "Lunch and Learn" 2018-2019, Flow Cytometry Seminar Series (multiple sessions). **PIT** • **Strogies, P.** and **Petrillo, J.**, Presented "Instrument Shop Safety" at the Safety Officer's Luncheon, *June 19, 2019*

Classes and Training

BIRC • Alison North taught a Super-Resolution Microscopy course, Neurosciences Division at McGill University, Montreal, May 6-10, 2019 • **FCRC** "Beyond the Basics" Flow Cytometry Classes were run every two months • **CBC** Orientation, Investigator Training Workshops, Updated Aseptic Techniques & Tri-Institutional Seminar • **PIT** Autonomous and Simple Equipment Training and Heavy Equipment • **HTSRC** "Lunch and Learn with Agilent," March 12, 2019, on new applications for Seahorse XF instrument. • **GRC** hosted an Illumina seminar October 23, 2018 (Rockefeller University) • **HPC** hosted a Life Sciences Field Day symposium on September 27, 2018, which included eight talks, and two panel discussions.

Key Methodology Publications/Presentations

BAFN-36, 2/21/19, (at Rockefeller University) "Best practices for developing and managing SRLs: feedback from experience what's been done in Europe", presenter and moderator Alena

Keprava, Research Support Specialist, **FCRC** at the Rockefeller University. • Duvall LB, Ramos-Espiritu L, Barsoum KE, Glickman JF, Vosshall LB. "Small-Molecule Agonists of Ae. aegypti Neuropeptide Y Receptor Block Mosquito Biting." *Cell*. 2019 Feb 7;176(4):687-701.

Technology and Vendor Presentations

FCRC • "Discover More with the Attune NxT" presented by Dan Silberman, PhD Technical Sales Specialist, Flow Cytometry ThermoFisher Scientific, July 17, 2018. • "Sample Preparation and Considerations for Optimizing Success for Sensitive Downstream Applications" presented by Eileen Piwarzyk, PhD, Regional Sales Manager and Caleph Wilson, PhD, Field Application Scientist, Miltenyi Biotec, September 20, 2018. • "Simultaneous Proteomics and Transcriptomics - TotalSeq™ and The Future of Single Cell Analysis" presented by Ashley Cornett, Ph.D., Technical Application Scientist/ Mid-Atlantic Team Lead, BioLegend November 6, 2018.

Resource Center Staff at RU Sponsored Retreats:

Deena Oren (SBRC) **Amalia Pasolli (EMRC)** attended *Rockefeller University's 2019 Stem Cells, Development, and Cancer Retreat*, September 16 and 17, 2019. **Fraser Glickman (HTSRC)** **Henrik Molina (PRC)** **Jim Petrillo (PIT)** **Connie Zhao (GRC)** attended the *Rockefeller Neuroscience Retreat*, May 13, 2019. **Fraser Glickman (HTSRC)** attended the *Center for Basic and Translational Research on Disorders of the Digestive System Retreat*, October 14 and 15, 2019.

PROMOTIONS

Electron Microscopy

- **Nadine Soplop**, promoted to Senior Research Support Specialist

NEW HIRES

Flow Cytometry

- **Alena Keprava**, Research Support Specialist
- **Samer Shalaby**, Research Support Associate

Genomics

- **Xiaoyun Qiu**, Research Support Assistant

Proteomics

- **Hanan Alwaseem**, Research Support Specialist

Vertebrate Genome Laboratory

- **Jennifer Balacco**, Research Support Assistant

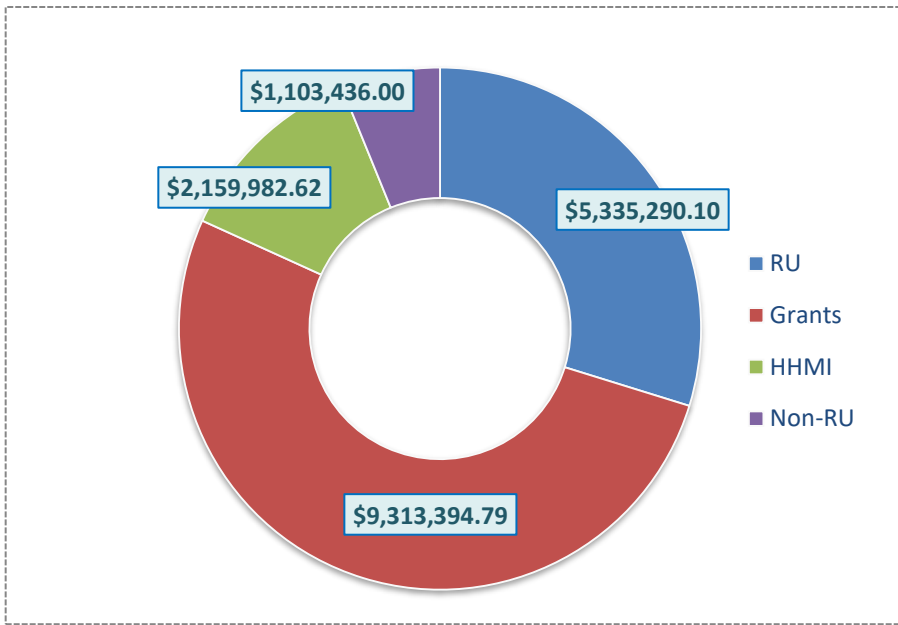
Number of Labs Using the Resource Centers	RU	External
Bioimaging	58	32
Bioinformatics	19	0
CBC	45	2
Cryo EM	19	0
Electron Microscopy	24	13
Flow Cytometry	40	1
Genomics	52	3
CRISPR & Genome Editing	16	5
Glasswashing	70	1
High Performance Computing	46	1
High Throughput & Spectroscopy	37	27
Antibody & Bioresource	8	>100
Precision Instrumentation Technologies	31	1
Proteomics	43	51
Structural Biology	15	1
Transgenic & Reproductive Technologies	18	1

Operating funds for the resource centers are drawn from the University's annual operating budget and are offset, to varying levels, by user fees. User fees for Center services and products are set to recover direct operating costs, e.g., consumables, service contracts and labor. User fees do not include capital equipment costs.

User fees for services and products are established by the University administration with input from the Centers' Scientific Advisory Committees, and with review by University Finance.

Resource Center	FY17		FY18		FY19	
	Operating	Cost Recovery	Operating	Cost Recovery	Operating	Cost Recovery
Antibody & Bioresource	144,183	61,734	26,761	70,469	32,753	32,753
Bio-Imaging	997,437	791,505	1,003,285	756,523	1,227,634	756,368
CBC	10,693,729	8,413,349	11,337,721	9,271,764	11,578,969	9,540,218
CRISPR & Genome Editing	898,159	120,162	938,438	172,743	968,614	172,460
Cryo EM	442,690	284,556	541,055	302,408	604,847	308,274
Electron Microscopy	686,201	276,655	619,463	104,439	471,714	98,077
Flow Cytometry	796,497	468,320	940,313	537,565	1,044,822	487,401
Genomics	2,198,209	1,902,927	2,138,625	2,150,479	2,509,800	2,487,546
Glasswashing	444,843	232,214	459,917	234,725	510,104	269,399
High Throughput & Spectroscopy	1,089,927	705,555	1,358,610	804,408	1,278,697	723,556
PIT	135,720	43,500	174,637	19,675	514,750	111,240
Proteomics	1,139,406	715,247	1,206,845	807,458	1,307,846	740,472
Reference Genome	230,537	73,174	716,608	269,427	1,553,506	982,325
Structural Biology	173,927	10,285	194,468	6,958	179,467	7,505
Transgenic & Reproductive Technologies	907,368	574,021	1,014,948	455,094	1,061,884	480,000
TOTAL	20,834,650	14,611,470	22,644,933	13,743,187	24,303,060	17,164,841
Subsidy	30%		39%		29%	

BY THE NUMBERS – OPERATIONAL & CAPITAL INVESTMENTS



Cost Recovery by Funding Source:

RU funds	5,335,290.10
Grant funds	9,313,394.79
HHMI	2,159,982.62
External Users	1,103,436.00

Total Recovery \$17,912,103.51

Capital Equipment (>\$70K) FY03 - 19

