

Spring 2019



Duke Microbiome Center

Welcome to the new DMC newsletter!

This quarterly newsletter is provided by the Duke Microbiome Center to inform the Duke University community about activities, resources, news, funding and educational opportunities, and recent highlights in the microbiome sciences at Duke and beyond. If you have items you would like for us to include in a future newsletter, or if you would like to add someone to our newsletter listserv to receive future issues, please email [Shirley Foster](mailto:Shirley.Foster@duke.edu). For further information on the DMC, please visit our [website](http://www.duke.edu/microbiome).

Funding opportunities through the DMC

The DMC has two active funding opportunities:

- 1) **DMC Rolling Voucher Program:** Duke University has established shared resources that avail state-of-the-art technologies to interrogate microbiome structure and function to Duke investigators. The Duke Microbiome Center offers a rolling voucher program to provide its investigators access to these shared resources, particularly for microbiome

projects that are not yet externally funded. Eligibility is limited to Duke Microbiome Center faculty and their trainees, and the maximum budget is \$5,000. There is no deadline for these proposals. For more information, see [the program announcement](#).

2) DMC Development Grant Program: The DMC supports microbiome science at Duke University through pilot project funding. The DMC is pleased to announce this new request for proposals for DMC Development Grants. The objective of the DMC Development Grant program is to support interdisciplinary and collaborative research projects in the microbiome sciences at Duke University. The maximum budget for these one-year awards is \$100,000 and the application deadline is 12PM EST, Monday May 13th, 2019. For more information, see [the program announcement](#).



Message from the Director

The mission of the Duke Microbiome Center (DMC) is to cultivate and support microbiome science across Duke University. This is both exciting and challenging because DMC labs are scientifically diverse and distributed across multiple departments in the School of Medicine, Trinity College, the Pratt School of Engineering, and the Nicholas School of the Environment. To help us understand the diverse and evolving needs of microbiome scientists across the DMC and Duke University, I have been working with DMC Associate Directors Lawrence David, Claudia Gunsch, and Anthony Sung to engage in discussions with different subgroups of faculty within the DMC. Our most recent conversation in January focused on members of our clinical research community, in order to discern the current and emerging needs for clinical microbiome

research at Duke. Below I'll summarize some of the key needs that emerged from that discussion.

- As human and clinical microbiome research activities have continued to expand at Duke, an increasing number of researchers are struggling to understand what types of microbiome research must be reviewed by the Duke Internal Review Board (IRB) and how to best navigate that process. Representatives of the [Duke IRB](#) (Sharon Ellison and Jody Power) attended this meeting and offered helpful advice on several points. They encouraged all of us to contact them with questions, and offered to work with the DMC develop a list of FAQ and best practices which we hope to distribute later this year.
- One of the consequences of the recent growth in clinical microbiome research at Duke is the proliferation of biorepositories containing microbiome samples as well as data repositories derived from those projects. The [Duke Microbiome Shared Resource](#) is available to share best practices with those starting new microbiome biorepositories, but many investigators still face challenges on the best way to manage those important resources and make them visible and available to the broader Duke community as well as external users. Similarly, large and complex datasets derived from clinical microbiome studies are presenting challenges in long-term data storage and in the bioinformatic analysis of microbiome data.
- Several projects are seeking to integrate multiple modes of data, such as microbiome amplicon and metagenomic sequencing, metabolomics, proteomics and clinical data. The [Duke Genomic Analysis and Bioinformatics Shared Resource](#) is prepared to assist in all microbiome bioinformatic analysis, and there are active

discussions between that core and DMC investigators to establish best practices for multi-modal data analysis. One appealing solution for multi-modal data management and analysis is the [Pedigene](#) system administered here at Duke.

- We need ensure that the wealth of expertise, resources, sample and data repositories we have in the Duke microbiome community is clearly visible and navigable. This is important in order to facilitate new internal and external collaborations and projects, and will become increasingly challenging as our DMC community continues to grow. If you ever have questions about what specific microbiome expertise, resources, or repositories exist within our Duke community, please get in touch with the DMC leadership team which consists of myself, Lawrence David, Claudia Gunsch, and Anthony Sung.

Together, we have discerned some of the complex and evolving needs of a growing clinical microbiome research community, and the DMC will be working in the months ahead to help address them. In a future newsletter, I look forward to sharing insights we have gained through discussions with DMC faculty members within Trinity College into their unique needs and how the DMC could help meet them.

- John F. Rawls, Ph.D., Director of the Duke Microbiome Center

Reminder: IBIEM Training Program application process is approaching! The NSF-funded graduate training program [Integrative Bioinformatics for Investigating and Engineering Microbiomes \(IBIEM\)](#) will announce its 2019 call for applications later this spring. This 1-year fellowship program is available to graduate students at Duke University and North Carolina A&T State University. Please go to the link above to learn more about IBIEM and how to apply!

Upcoming Conferences

Keystone Symposium - Microbiome: Chemical Mechanisms and Biological Consequences

March 10—14, 2019 (Abstract submission already closed)
Fairmont The Queen Elizabeth, Montreal, Québec, Canada
(click [here](#) for more information)

Gut Microbiota for Health World Summit 2019

March 23 & 24, 2019 (Abstract submission already closed)
Miami, FL, US
(click [here](#) for more information)

Multidisciplinary Benign Urology Research Day: Microbiome Sciences Impact on Urology, & Individualizing Urologic Care with Data Science and Predictive Analytics

April 26, 2019 (Abstracts due: March 29, 2019)
Albert Eye Research Institute Auditorium, Duke University, Durham, NC
(click [here](#) for more information)

Gordon Research Conference - Animal-Microbe Symbioses as Nested Ecosystems

June 16 - 21, 2019 (Application deadline: May 19, 2019)

Mount Snow, West Dover, VT, US

(click [here](#) for more information)

Cold Spring Harbor Laboratory - Microbiome

July 18-21, 2019 (Application deadline: May 3, 2019)

Cold Spring Harbor, NY, US

(click [here](#) for more information)

The Gastrointestinal Tract XVIII Conference: Integrated Biology of the GI Super-Organ

July 28-August 2, 2019 (Advanced registration deadline: June 12, 2019)

Steamboat Springs, CO, US

(click [here](#) for more information)

For a full listing of other microbiome conferences, click [here](#).

Upcoming DMC meetings

Microbiome Lunches: This monthly research-in-progress series is held on Wednesdays at 12PM in 208 CARL, and is open to the entire DMC community. If you would like to present your work in a future DMC Microbiome Lunch, please contact [Joshua Granek](#).

- **March 20, 2019** – [Anders Dohlman](#) (Shen lab) and [Monique Vaughan](#)
- **April 17, 2019** – [Brianna Petrone](#) (David lab) and [Zack Holmes](#) (David lab)
- **May 15, 2019** – [Lauren Davey](#) (David lab) and [Jessica McCann](#) (Rawls lab)

Next DMC faculty meeting: April 24th, 1PM, CIEMAS 2240

Core Facility Highlights

The DMC supports and advises several core facilities at Duke that support the microbiome sciences. This includes the [Duke Microbiome Shared Resource](#), the [Duke Genomics Analysis and Bioinformatics Shared Resource](#), and the [Duke Gnotobiotic Core](#). In this newsletter we highlight the Duke Microbiome Shared Resource, which is directed by Dr. Holly Dressman:

The [Duke Microbiome Shared Resource](#) provides a centralized resource hub in collaboration with the Duke Microbiome Center to address the role of microbial systems in human healthcare, food production and environmental restoration. This resource provides access to a variety of services that enable researchers to focus on microbial communities and their potential relationship in immune oncology, cancer research and infectious disease. We provide experimental design, sample collection SOPs, support for clinical coordinators, nucleic acid extraction, 16S/ITS/metagenomics and metranscriptomic sequencing. Nanostring, qRT-PCR and droplet digital PCR technologies are available for sequence validation and detection of microbial communities. For more information please visit our website above or email [Dr. Holly Dressman](#).

Recent DMC Publications

DebRoy S; Li X; Kalia A; Galloway-Pena J; Shah BJ; Fowler VG; Flores AR; Shelburne SA
Identification of a chimeric emm gene and novel emm pattern in currently circulating strains of emm4 Group A Streptococcus. Microbial genomics 11/9/2018

<https://scholars.duke.edu/individual/pub1357124>

Chan LC; Rossetti M; Miller LS; Filler SG; Johnson CW; Lee HK; Wang H; Gjertson D; Fowler VG; Reed EF Protective immunity in recurrent *Staphylococcus aureus* infection reflects localized immune signatures and macrophage-conferred memory. *Proceedings of the National Academy of Sciences of the United States of America* 11/1/2018

<https://scholars.duke.edu/individual/pub1354974>

Kelly MS; Surette MG; Smieja M; Rossi L; Luinstra K; Steenhoff AP; Goldfarb DM; Pernica JM; Arscott-Mills T; Boiditswe S Pneumococcal Colonization and the Nasopharyngeal Microbiota of Children in Botswana. *The Pediatric infectious disease journal* 11/1/2018

<https://scholars.duke.edu/individual/pub1346508>

Finn SMB; Scheuermann U; Holzkecht ZE; Parker W; Granek JA; Lin SS; McKenney EA; Barbas AS Effect of gastric fluid aspiration on the lung microbiota of laboratory rats. *Experimental lung research* 11/22/2018 <https://scholars.duke.edu/individual/pub1358422>

Magain N; Truong C; Goward T; Niu D; Goffinet B; Sérusiaux E; Vitikainen O; Lutzoni F; Miadlikowska J Species delimitation at a global scale reveals high species richness with complex biogeography and patterns of symbiont association in *Peltigera* section *Peltigera* (lichenized Ascomycota: Lecanoromycetes) *Taxon* 10/17/2018

<https://scholars.duke.edu/individual/pub1357364>

Korotkin HB; Swenie RA; Miettinen O; Budke JM; Chen K-H; Lutzoni F; Smith ME; Matheny PB Stable isotope analyses reveal previously unknown trophic mode diversity in the Hymenochaetales. *American journal of botany* 11/1/2018

<https://scholars.duke.edu/individual/pub1356959>

Lutzoni F; Nowak MD; Alfaro ME; Reeb V; Miadlikowska J; Krug M; Arnold AE; Lewis LA; Swofford DL; Hibbett D Contemporaneous radiations of fungi and plants linked to symbiosis. *Nature communications* 12/21/2018 <https://scholars.duke.edu/individual/pub1363543>

Reese AT; Pereira FC; Schintlmeister A; Berry D; Wagner M; Hale LP; Wu A; Jiang S; Durand HK; Zhou X Microbial nitrogen limitation in the mammalian large intestine. *Nature microbiology* 12/1/2018 <https://scholars.duke.edu/individual/pub1356207>

Meredith HR; Andreani V; Ma HR; Lopatkin AJ; Lee AJ; Anderson DJ; Batt G; You L Applying ecological resistance and resilience to dissect bacterial antibiotic responses. *Science advances* 12/5/2018 <https://scholars.duke.edu/individual/pub1361573>

Coates M; Blanchard S; MacLeod AS Innate antimicrobial immunity in the skin: A protective barrier against bacteria, viruses, and fungi. *PLoS pathogens* 12/6/2018 <https://scholars.duke.edu/individual/pub1361561>

Choi HW; Suwanpradid J; Kim IH; Staats HF; Haniffa M; MacLeod AS; Abraham SN Perivascular dendritic cells elicit anaphylaxis by relaying allergens to mast cells via microvesicles. *Science (New York, N.Y.)* 11/1/2018 <https://scholars.duke.edu/individual/pub1356897>

Dallas TA; Han BA; Nunn CL; Park AW; Stephens PR; Drake JM Host traits associated with species roles in parasite sharing networks *Oikos* 1/1/2019 <https://scholars.duke.edu/individual/pub1350805>

Duan Y; Xie N; Song Z; Ward CS; Yung C-M; Hunt DE; Johnson ZI; Wang G A High-Resolution Time Series Reveals Distinct Seasonal Patterns of Planktonic Fungi at a Temperate Coastal Ocean Site (Beaufort, North Carolina, USA). *Applied and environmental microbiology* 11/1/2018 <https://scholars.duke.edu/individual/pub1344415>

Kelly MS; Surette MG; Smieja M; Rossi L; Luinstra K; Steenhoff AP; Goldfarb DM; Pernica JM; Arscott-Mills T; Boiditswe S Pneumococcal Colonization and the Nasopharyngeal Microbiota of Children in Botswana. *The Pediatric infectious disease journal* 11/1/2018 <https://scholars.duke.edu/individual/pub1346508>

Pruneda JN; Bastidas RJ; Bertoulaki E; Swatek KN; Santhanam B; Clague MJ; Valdivia RH; Urbé S; Komander D A Chlamydia effector combining deubiquitination and acetylation activities induces Golgi fragmentation. *Nature microbiology* 12/1/2018 <https://scholars.duke.edu/individual/pub1357558>

Sixt BS; Núñez-Otero C; Kepp O; Valdivia RH; Kroemer G Chlamydia trachomatis fails to protect its growth niche against pro-apoptotic insults. *Cell death and differentiation* 10/30/2018 <https://scholars.duke.edu/individual/pub1357557>

Silverman JD; Durand HK; Bloom RJ; Mukherjee S; David LA Dynamic linear models guide design and analysis of microbiota studies within artificial human guts. *Microbiome* 11/12/2018 <https://scholars.duke.edu/individual/pub1357414>

Metin B; Dögen A; Yildirim E; de Hoog GS; Heitman J; Ilkit M Mating type (MAT) locus and possible sexuality of the opportunistic pathogen *Exophiala dermatitidis*. *Fungal genetics and biology* : FG & B 1/3/2019 <https://scholars.duke.edu/individual/pub1364659>

Valdivia RH; Bastidas RJ The Expanding Molecular Genetics Tool Kit in Chlamydia. *Journal of bacteriology* 12/1/2018 <https://scholars.duke.edu/individual/pub1355234>

Hughes BL Group A *Streptococcus puerperal* sepsis: an emerging obstetric infection? *BJOG* : an international journal of obstetrics and gynaecology 1/1/2019 <https://scholars.duke.edu/individual/pub1353751>

Kadokia R; Nodzinski M; Talbot O; Kuang A; Bain JR; Muehlbauer MJ; Stevens RD; Ilkayeva OR; O'Neal SK; Lowe LP Maternal metabolites during pregnancy are associated with newborn outcomes and hyperinsulinaemia across ancestries. *Diabetologia* 11/27/2018 <https://scholars.duke.edu/individual/pub1359067>

Frerichs L; Smith NR; Lyden J; Gaskin K; Skinner A; Armstrong S Weight-related quality of life and temperament as predictors and moderators of outcomes among treatment-seeking, low-income, ethnically diverse children with obesity. *Translational behavioral medicine* 11/26/2018 <https://scholars.duke.edu/individual/pub1358555>

Barnhill A; Palmer A; Weston CM; Brownell KD; Clancy K; Economos CD; Gittelsohn J; Hammond RA; Kumanyika S; Bennett WL Grappling With Complex Food Systems to Reduce Obesity: A US Public Health Challenge. *Public health reports (Washington, D.C. : 1974)* 11/1/2018 <https://scholars.duke.edu/individual/pub1358813>

Microbiome Funding Opportunities

Advancing Translational and Clinical Probiotic/Prebiotic and Human Microbiome Research (R01 Clinical Trial Optional) Faculty Award; Amount: See solicitation for details (see [here](#)) Deadline: 6/5/2019

Advancing Mechanistic Probiotic/Prebiotic and Human Microbiome Research (R01) Faculty Award; Amount: See solicitation for details (see [here](#)) Deadline: 6/5/2019

Innovator Awards Program for Inflammatory Bowel Disease Research Junior Faculty; \$100,000 (see [here](#)) Deadline: 3/15/2019

Age-related Microbiota Changes and their Implications in Chronic Disease Prevention, Treatment and Progression (R01, R21 Clinical Trial Optional) Faculty Award; Amount: See solicitation for details (see [here](#)) Deadline: 6/5/2019

The Mechanistic Role of the Microbiome in the Pathobiology of Heart, Lung, Blood, and Sleep Diseases (R01 - Clinical Trial Not Allowed) Faculty Award; Amount: See solicitation for details (see [here](#)) Deadline: 6/5/2019

Role of Gut Microbiome in Regulating Reproduction and Its Impact on Fertility Status in Women Living with and Without HIV (R01, R21 Clinical Trial Optional) Faculty Award; Amount: See solicitation for details (see [here](#)) Deadline: 6/5/2019

NCCIH Natural Product Phase II Clinical Trial Cooperative Agreement (U01 Clinical Trial Required) Faculty Award; Amount: See solicitation for details (see [here](#)) Deadline: 6/7/2019

Generating New Insights and Mechanistic Understanding of Antibiotic Resistance Development (R01, R21 Clinical Trial Not Allowed) National Institutes of Health; Faculty Award; Amount: See solicitation for details (see [here](#)) Deadline: 6/5/2019

AHRQ -- Large Research Projects for Combating Antibiotic-Resistant Bacteria (CARB)
(R01, R18) National Institutes of Health; Faculty; \$2,500,000 (see [here](#)). Deadline: 6/5/2019