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The Center is home to a corps of Center Postdoctoral Fellows, chosen from nominations made by senior theoretical scientists around the world. A group of senior Faculty Fellows, chosen from science and engineering departments across the campus, are responsible for guiding the Center. Center activities include focused topical programs chosen from proposals by Princeton faculty across the natural sciences. The Center is located on the fourth floor of Jadwin Hall, in the heart of the campus “science neighborhood”. The Center hopes to become the focus for innovation and cross-fertilization in theoretical natural science at Princeton.

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To find out more about Center Postdoctoral Fellowships and Programs see: https://pcts.princeton.edu

Space: The Final Frontier of Microbial Communities

January 18-20, 2023

Organizers
Sujit Datta
Alejandro Martinez-Calvo
Linta Reji
Ned Wingreen
Xinning Zhang

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Space: The Final Frontier of Microbial Communities
Wednesday, January 18, 2023

8:45 Coffee & light breakfast at PCTS
9:00-9:05 Welcome/Introduction, Alejandro Martinez-Calvo
9:05-9:15 Memorial for Alma Dal Co, Ned Wingreen

Session I: Aquatic communities
9:15-9:55 Otto Cordero, MIT (30 min + 10 min Q&A)
Microbial aggregates as an emergent level of biological organization

9:55-10:20 Amala Mahadevan, Woods Hole (20 min + 5 min Q&A)
Patchiness in oceanic plankton

10:40-11:05 Andrew Babbin, MIT (20 min + 5 min Q&A)
A race for space: how denitrifiers compete to establish themselves in particulate environments

11:05-11:30 Naomi Levine, USC (20 min + 5 min Q&A) ZOOM
Breaking open the microbial black-box to improve our understanding of biogeochemical cycling

11:30-11:55 Stephen Giovannoni, OSU (20 min + 5 min Q&A)
Ocean carbon sequestration and the evolution of recalcitrant carbon metabolism in marine bacteria

11:55-1:10 Lunch at PCTS

Session II: Terrestrial communities
1:10-1:50 Jennifer Pett-Ridge, LLNL (30 min + 10 min Q&A)
Spatial and temporal dynamics of rhizosphere cross-kingdom interactions.

1:50-2:15 Trent Northen, LBL (20 min + 5 min Q&A)
Chemistry in the rhizosphere: Metabolites that mediate beneficial plant-microbe interactions

2:15-2:35 Break

Space: The Final Frontier of Microbial Communities
Wednesday, January 18, 2023 (cont.)

2:35-3:00 Serita D. Frey, U New Hampshire (20 min + 5 min Q&A)
Microbial traits linked to soil organic matter formation and stabilization

3:00-3:25 Darcy McRose, MIT (20 min + 5 min Q&A)
Big roles for small molecules in the rhizosphere

3:25-3:45 Break

3:45-4:45 LIGHTNING TALKS FROM POSTER PRESENTERS
3. Anna Hancock, Princeton University. Rheology of the environment regulates bacterial growth.
4. Harish Kannan, University of California San Diego. Spatiotemporal dynamics of metabolite gradients control the growth kinetics of E. coli colonies on hard agar
5. Hyunseok Lee, MIT. Slow expanders invade by forming dented fronts in microbial colonies
6. Kiseok Lee, University of Chicago. How complex soil microbial communities cope with environmental changes

4:45-6:30 Poster Session and Welcome Reception at PCTS
Space: The Final Frontier of Microbial Communities

**Thursday, January 19, 2023**

8:45 AM  Coffee & light breakfast at PCTS

**Session III: Host-associated communities**

9:05-9:45  **KC Huang**, Stanford (30 min + 10 min Q&A)
Fantastic Voyage: a fantastic, spectacular, and terrifying journey through the gut

9:45-10:10  **Raghu Parthasarathy**, Oregon (20 min + 5 min Q&A)
Glimpses of gut microbes in actual guts

10:10-10:35  **Will Ludington**, Carnegie (20 min + 5 min Q&A)
A spatial niche in the Drosophila gut regulates assembly of a multispecies, symbiotic microbiome

10:35-10:55  Break

10:55-11:20  **Ophelia Venturelli**, UW Madison (20 min + 5 min Q&A)
Predicting and designing the dynamics and functions of human gut microbiota

11:20-11:45  **Ilana Brito**, Cornell (20 min + 5 min Q&A)
Close Encounters: Interactions at the gut epithelial interface

11:45-12:10  **William Harcombe**, Minnesota (20 min + 5 min Q&A)
Metabolic impacts on interaction scale and evolutionary dynamics in microbial systems

12:10-1:10  Lunch at PCTS

**Session IV: Other communities / general approaches**

1:10-1:50  **Uwe Sauer**, ETH (30 min + 10 min Q&A)
Metabolic cross-feeding networks in gut and ocean communities

1:50-2:15  **Lawrence David**, Duke (20 min + 5 min Q&A)
The effects of particle size on the gut microbiome

2:15-2:40  **Andrea Giometto**, Cornell (20 min + 5 min Q&A)
Evolutionary adaptation of non-motile cells to range expansion

2:40-3:00  Break

3:00-3:25  **Linchong You**, Duke (20 min + 5 min Q&A)
Predictive engineering of self-organized patterns

3:25-3:50  **Sujit Datta**, Princeton (20 min + 5 min Q&A)
Life in a tight spot: probing microbial community dynamics in crowded spaces

3:50-4:50  Breakout discussions + coffee

4:50-5:30  Summaries of breakout discussions

**Friday, January 20, 2023**

8:45  Coffee & Light Breakfast at PCTS

**Session V: Free-for-all**

9:05-9:45  **Terry Hwa**, UCSD (30 min + 10 min Q&A)
Evading the colonization-dispersal trade-off for bacteria growing on particulate matters

9:45-10:10  **Seppe Kuehn**, U Chicago (20 min + 5 min Q&A)
Global patterns in gene content emerge from microbial interactions

10:10-10:35  **Jeff Gore**, MIT (20 min + 5 min Q&A)
Community diversity maintained through spatio-temporal chaos

10:35-10:55  Break

10:55-11:45  Group discussion

11:45-12:00  Closing Remarks, **Ned Wingreen**