Sunday, April 15

3:00 pm Check-in

6:00 pm Reception *(Lobby)*

7:00 pm Dinner *(table assignments noted in the Dining Room)*

8:00 pm **Welcome and Introductory Remarks**
Mark Ellisman, University of California San Diego & HHMI/Janelia

8:10 pm **Opening Talks**

8:10 pm **Thijs JG. Ettema**, Uppsala University
The origin of complex cells

8:35 pm **Victoria Orphan**, California Institute of Technology
Syntrophic interactions between methane-oxidizing archaea and bacteria in spatially structured consortia

9:00 pm Refreshments available at Bob's Pub

NOTE:
Meals are in the **Dining Room**
Talks are in the **Seminar Room**
Posters are in the **Lobby**

Monday, April 16

7:30 am Breakfast *(service ends at 8:45 am)*

9:00 am **Session: Cell biology, shape and size**
Chair: David Stern

9:00 am **Karolin Luger**, University of Colorado at Boulder
The structure of histone-based chromatin in Archaea: Probing the origins of the eukaryotic nucleosome

9:25 am **Ann-Christin Lindas**, Stockholm University
Cell division and actin cytoskeleton in archaea

9:50 am **Buzz Baum**, University College London
Evolution of eukaryotic cell division

10:15 am **Martin Hetzer**, Salk Institute for Biological Studies
Age mosaicism across multiple scales in adult tissues

10:40 am Break

11:05 am **Session 2: Symbiosis and parasitism**
Chair: Jan Löwe

11:05 am **John McCutcheon**, University of Montana
How does a bacterial endosymbiont become part of its host cell?

11:30 am **Gareth Bloomfield**, MRC LMB
Sex and symbiosis in eukaryotic evolution

11:55 am **David S. Roos**, University of Pennsylvania
Evolutionary cell biology: Deep insights from big data

12:20 pm **General Discussion**

12:45 pm Lunch *(Service ends at 1:15 pm)*

1:45 pm **Session 3: Organelle evolution/membrane transport**
Chair: Martin Hetzer

1:45 pm **Gregory Pazour**, University of Massachusetts Medical School
The eukaryotic cilium

2:10 pm **Short talk: Shane McInally**, University of California, Davis
Local regulation of IFT train assembly and injection at eight distinct flagellar pores in the multiflagellate, Giardia lamblia

2:25 pm **Jan Löwe**, MRC Laboratory of Molecular Biology
Where and when did eukaryotic F-actin and microtubules originate?

2:50 pm **Short talk: Itay Budin**, University of California, Berkeley
The role of membrane viscosity in cellular respiration and its implications for the evolution of lipid composition in eukaryotes

3:05 pm Break

3:30 pm Session 4: Organelle evolution and membrane transport
Chair: Laura Hug

3:30 pm **Tobias Walther**, HHMI/Harvard Medical School
Mechanisms and origins of metabolic energy buffering

3:55 pm **Samara Reck-Peterson**, University of California, San Diego
Molecular mechanisms of the intracellular transport system

4:20 pm **Short talk: Emily K. Herman**, University of Alberta
Conservation and evolvability of membrane trafficking machinery in eukaryotes

4:35 pm **Short talk: María Inmaculada Ramírez Macías**, University of Alberta
Study of the contractile vacuole using Dictyostelium discoideum as a model

4:50 pm Break

5:05 pm BREAKOUT DISCUSSION SESSIONS (each group discusses both topics)

5:05-5:50 pm *Metagenomics: Searching for the last common ancestor of Eukaryotes*
5:50-6:10 pm Break
6:10-6:55 pm *Tools for studying Eukaryotic evolution*
6:55-7:15 pm Break

Group A | Photon Room
Group B | Electron Room
Group C | Axon Room
Group D | Dendrite Room

7:15 pm Dinner *(Table assignments noted in the Dining Room)*

8:15 pm Regroup for breakout session summaries

Metagenomics: Moderated by Tom Cavalier-Smith and Karolin Luger
Tools: Moderated by David Roos sand Anja Spang

9:15 pm Refreshments available at Bob's Pub

Co-sponsored by Janelia and NSF

Tuesday, April 17

7:30 am Breakfast *(service ends at 8:45 am)*

9:00 am **Session 5: Phylogenomics and metagenomics**
Chair: Jennifer Lippincott-Schwartz

9:00 am **Tom Cavalier-Smith**, University of Oxford
Intracellular coevolutionary logic and phylogeny of eukaryogenesis: Firmibacterial L-forms, the neomuran revolution, and the phagotrophic origin of eukaryotes

9:25 am **Anja Spang**, Royal Netherlands Institute for Sea Research
The metabolic potential of ASGARD archaea in light of eukaryogenesis

9:50 am **Laura Hug**, University of Waterloo
Environmental metagenomic influences on phylogenomics

10:15 am **Matthew Brown**, Mississippi State University
A step into the future of protistology, a single cell transcriptome revolution

10:40 am Break

11:05 am **Session 6: Theory**
Chair: Scott Dawson

11:05 am **Eric Libby**, Umeå University
Theoretical framework for understanding the evolutionary origins of multicellularity

11:30 am **Short talk: Chris Kempes**, Santa Fe Institute
Biological scaling and the transition to eukaryotes

11:45 am **Michael Lynch**, Arizona State University
The bioenergetic cost of producing and maintaining cells: An evolutionary perspective

12:10 pm **Short talk: István Zachar**, Centre for Ecological Research
The origin of mitochondria from an eco-evolutionary point of view

12:25 pm Lunch *(service ends at 1:00 pm)*

1:00 pm Building Tour *(optional - meet at reception)*

1:45 pm **Session 7: Tools**
Chair: Samara Reck-Peterson

1:45 pm **Scott Dawson**, University of California, Davis
New methods to access free-living amoebae genomes from mixed consortia

2:10 pm **Short talk: David S. Booth**, University of California, Berkeley
New genetic tools for studying the origin of animals

2:25 pm **Steven Haddock**, Monterey Bay Aquarium Research Institute
Scruting the inscrutable: What ctenophores can and cannot tell us about metazoan origins

2:50 pm **Leonid L. Moroz**, University of Florida
Origins of eukaryotes, cell types & multicelularity through the lens of single-cell genomics: Insights from 1st one million cells sequenced across phyla

3:15 pm Break

3:40 pm **Session 8: Microbial ecology, diversity and multicellularity**
Chair: Eric Libby

3:40 pm **Short talk: Sarah Guest**, University of California, Davis
Branched cytoskeletal networks and generation of complexity in the aggregatively multicellular Rhizarian amoebae

3:55 pm **Roland Hatzenpichler**, Montana State University
Multicellular magnetotactic bacteria - a window into the early evolution of advanced life

4:20 pm **Marc Kirschner**, Harvard Medical School
How early eukaryotes were able to contribute to the subsequent evolvability of multicellular organisms

4:45 pm Break

5:00 pm **BREAKOUT DISCUSSIONS** (4 groups, each discussing both topics)

5:00-5:45 pm *Evolution of signaling networks and their relationship with metabolic pathways*
5:45-6:05 pm Break
6:05-6:50 pm *Evolution of subcellular compartments and cytoskeleton*
6:50-7:15 pm Break

Group A | Photon Room
Group B | Electron Room
Group C | Axon Room
Group D | Dendrite Room

7:15 pm Dinner

8:15 pm **Regroup for breakout session summaries**
Signaling Networks: Moderated by Mark Kirschner and Jennifer Lippincott-Schwartz
Subcellular Compartments: Moderated by Buzz Baum and Samara Reck-Peterson

9:15 pm Refreshments available at Bob's Pub

Co-sponsored by Janelia and NSF

Wednesday, April 18

7:30 am Breakfast *(service ends at 8:45 am)*

9:00 am Session 9: Cell biology, shape and size
Chair: Mark Ellisman

9:00 am **Elitza Tocheva**, University of Montreal
Evolution of the bacterial outer membrane

9:25 am **Rut Carballido-Lopez**, French National Institute for Agricultural Research
Dynamic interplay between the bacterial actin cytoskeleton and the bacterial cell wall

9:50 am **Jennifer Lippincott-Schwartz**, Janelia Research Campus/HHMI
Inter-organelle communication and dynamics: Implications for the evolution of different eukaryotic cell types

10:15 am Break

10:45 am Closing Discussion / Conclusions from Breakouts / Final Remarks

12:00 pm Lunch and/or Departure

12:30 pm First shuttle to Dulles
1:30 pm Second shuttle to Dulles
2:30 pm Last shuttle to Dulles