



The Jackson  
Laboratory

## The Short Course on the Application of Machine Learning for Automated Quantification of Behavior

Bar Harbor, Maine  
October 9 - 13, 2022

### Schedule of Activities

#### Sunday, October 9

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2:00 pm - 8:00 pm	<i>Registration &amp; COVID-19 on-arrival testing</i>
6:00 pm	Dinner
7:00 pm	Poster Session

#### Monday, October 10

#### ***Fundamentals of Computer Vision and Machine Learning***

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7:00 am	<i>Breakfast</i>
8:00 am	<b>Welcome &amp; Announcements</b> Vivek Kumar, Ph.D., The Jackson Laboratory
8:00 - 9:00 am	<b>Introductions/What is Behavior</b> Gordon Berman, Ph.D., Emory University
9:00 - 10:00 am	<b>Keynote – Using Machine Vision and Learning to Analyze Animal Behavior</b> (Remote Presentation) Kristin Branson, Ph.D., Janelia Research Campus
10:00 - 10:15 am	<i>Break</i>
10:15 - 11:15 am	<b>Deep Learning-Based Pose Tracking</b> Talmo Pereira, Ph.D., The Salk Institute for Biological Studies
11:15 - 12:15 pm	<b>Behavioral Analysis with Deep Learning</b> Alexander Mathis, Ph.D., Swiss Federal Institute of Technology
12:15 - 1:00 pm	<i>Lunch</i>
1:00 - 3:00 pm	<b>Break for Activities led by Instructors</b>

- 3:00 - 6:00 pm      **Workshops – DLC and SLEAP**  
Alexander Mathis, Ph.D., Swiss Federal Institute of Technology &  
Talmo Pereira, Ph.D., The Salk Institute for Biological Studies
- 6:00 - 7:00 pm      *Dinner*
- 7:00 - 8:30 pm      **Evening Discussion**  
Ishmal Abdus-Saboor, Ph.D., University of Pennsylvania

## **Tuesday, October 11**

### ***Fundamentals of Behavior Quantification***

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- 7:00 am              *Breakfast*
- 7:45 am              **Announcements**  
Gordon Berman, Ph.D., Emory University
- 8:00 - 9:00 am      **Keynote - Interrogating Neural Mechanisms Underlying Spontaneous Behavior Using MoSeq**  
Sandeep Robert Datta, M.D., Ph.D., Harvard Medical School
- 9:00 - 10:00 am     **Measuring Behavior Across Scales**  
Gordon Berman, Ph.D., Emory University
- 10:00 - 10:15 am    *Break*
- 10:15 - 11:15 am    **Keynote – Quantifying and Modeling Social Behaviors (Remote Presentation)**  
Mala Murthy, Ph.D., Princeton University
- 11:15 - 12:15 pm    **Sparse Sensing and Control in Agile Movements (Remote Presentation)**  
Bing Brunton, Ph.D., University of Washington, Seattle
- 12:15 - 1:00 pm     *Group Photo*  
*Lunch*
- 1:00 - 3:00 pm      **Break for Activities led by Instructors**
- 3:00 - 6:00 pm      **Workshop – Using MotionMapper for Unsupervised Behavioral Analysis**  
Gordon Berman Ph.D., Emory University  
*Teaching Assistant: Kanishk Jain*

**Workshop – Characterizing the structure of mouse behavior using Motion Sequencing (MoSeq)**

Sandeep Robert Datta, M.D., Ph.D., Harvard Medical School

*Teaching Assistants: Winthrop Gillis & Sherry Lin*

6:00 - 7:00 pm *Lobster Dinner*

7:00 - 8:30 pm **Evening Discussion**  
Gordon Berman Ph.D., Emory University

**Wednesday, October 12**  
***Big Behavioral Data***

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7:00 am *Breakfast*

7:45 am **Announcements**  
Ann Kennedy Ph.D., Northwestern University

8:00 - 9:00 am **Latent States of Neural Activity and Behavior**  
Scott Linderman, Ph.D., Stanford University

9:00 am - 10:00 am **Neurobiology of individuality**  
Benjamin De Bivort Ph.D., Harvard University

10:00 am - 10:15 am *Break*

10:15 am - 11:15 am **Leveraging Lingual Dexterity to Study Error-Driven Motor Control**  
Jesse Goldberg, Ph.D., Cornell University

11:15 am - 12:15 pm **Applications of Machine Vision to Preclinical Mouse Models**  
Vivek Kumar, Ph.D., The Jackson Laboratory

12:15 pm - 1:00 pm *Lunch*

1:00 pm – 3:00 pm **Break- Activities led by Instructors**

3:00 pm - 6:00 pm **Workshops - RCR practices in BBD and BBD**  
Scott Linderman, Ph.D., Stanford University & Benjamin De Bivort Ph.D., Harvard University

6:00 pm - 7:00 pm *Dinner*

7:00 pm - 8:30 pm **Evening Discussion**  
Ann Kennedy Ph.D., Northwestern University

## Thursday, October 13

### *Integration of Behavior, Neuroscience, and Genetics*

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- 7:00 am *Breakfast*
- 7:45 am **Announcements**  
Ishmal Abdus-Saboor, Ph.D., University of Pennsylvania
- 8:00 am - 9:00 am **Detailed Behavioral Tracking and its Applications in Neuroscience**  
Bence Olveczky, Ph.D., Harvard University
- 9:00 am - 10:00 am **The Application of Machine Learning for Automated Quantification of Behavior**  
Ishmail Adbus-Saboor, Ph.D., University of Pennsylvania
- 10:00 am - 10:15 am *Break*
- 10:15 am - 11:15 am **Quantifying Behavior in Dyadic Social Interactions**  
Ann Kennedy, Ph.D., Northwestern University
- 11:15 am - 12:15 pm **Quantifying Worm Behaviour in Multiwell Plates: A Few Challenges, Lots of Opportunities**  
Andre Brown, Ph.D., Imperial College London
- 12:15 pm *Shuttles & Carpool to Town Pier. Free parking at Bar Harbor Club*
- 12:30 pm - 2:30 pm *Bay Cruise w/ Boxed Lunches*
- 2:30 pm *Shuttles & Carpool to Highseas*
- 3:00 pm - 6:00 pm **Workshop - Supervised Behavior Analysis**  
Vivek Kumar, Ph.D., The Jackson Laboratory & Ann Kennedy, Ph.D., Northwestern University  
*Teaching Assistants: Brian Geuther & Leinani Hession*
- 6:00 pm - 7:00 pm *Dinner*
- 7:00 pm - 8:30 pm **Evening Discussion**  
Vivek Kumar, Ph.D., The Jackson Laboratory

## Friday, October 14

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- 7:00 am - 9:00 am *Grab-n-Go Breakfast & Departures*
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