# Tentative Agenda for Dagstuhl Seminar "Emerging Issues in Bioimaging AI Publications"

## Day 0 (Sunday, January 21, 2024):

- After 15:00: Guests arrival / check-in
- 6pm - open end: Self-service buffet in the *dinner hall* and spontaneous chats

## Day 1 (Monday, January 22, 2024):

- 7:30 - 8:45: Breakfast at the *dinner hall.*
- 8:45 - 9:00: Upload slides and computer test

### *Morning Session 1: Opening and Introduction*

- 9:00 - 9:25: Opening talk by organizers
  - Welcome
  - Overview of the agenda, set up expectation of these 3 days
  - Regarding the topic "ethical use of AI in bioimaging", we encourage people to think about this topic from the perspective of their own work and encourage presenters to think about this topic from the perspective of their presentation.
    - Maybe set up a virtual/real white board with sticky notes to let people drop in their thoughts, which will be summarized at the end.
    - Maybe do a summary of a few related papers.
- 9:25 - 10:15: Brief introduction (max 1.5 min per person, 27~28 persons in total)

**10:15 - 10:45: Coffee break at coffee area**

### *Morning Session 2: bioimaging publication, editors' perspective*

- 10:45 - 11:25: Information / presentation (40 min)
  - Rita Strack, "Publishing and reporting microscopy, image analysis and best practices for publishing AI"
  - Andrew Hugton, "Existing Cell Press policies on image presentation, and data and code sharing"
  - Q&A
- 11:25 - 12:00: Discussion (35 min)

**12:15 - 13:00: Lunch**

## *Afternoon Session 1: Image analysis evaluation / validation / trustworthy*

### Part A : Evaluation via explanation

- 13:00 - 13:20: Presentation (20 min)
  Axel Mosig, "Improving trustworthiness of ML in bioimaging through experimentally testable explanations"
- 13:20 - 13:40: Presentation (20 min)
  Assaf Zaritsky "Visual interpretability of deep learning models in bioimaging"
- 13:40 - 14:05: Discussion (25 min)

### Part B: Evaluation methods

- 14:05 - 14:25: Presentation (20 min)
  Evangelia Christodoulou, "reporting variability of model performance and proper validation of bioimaging AI models"
- 14:25 - 14:50: Presentation (25 min)
  Susanne Rafelski, Jianxu Chen, Matheus Viana "Application-appropriate validation"
- 14:50 - 15:15: Discussion (25 min)

**15:15 - 16:00: Coffee break at dinner hall**

## *Afternoon Session 2: bioimaging applications and tools*

### Part A: High-throughput and label-free analysis

- 15:40 - 16:00: Presentation (20 min)
  Anne Plant, High-volume, label-free imaging for quantifying single-cell dynamics in induced pluripotent stem cell colonies
- 16:00 - 16:20: Presentation (20 min)
  Matthias Gunzer "AI to analyze high-throughput cell migration data"
- 16:20 - 16:40: Presentation (20 min)
  Shalin Mehta "Generalist virtual staining of nuclei and cell membranes"
- 16:40 - 17:00 Discussion (20 min)

### Part B: Tools and reproducibility

- 17:00 - 17:20: Presentation (20 min)
  Florian Jug "AI4Life and reproducible AI-based analysis"
- 17:20 - 18:00: Information, demo and discussions (40 min)
  - Beth Cimini could share/demo workflow for containerized NN distribution

**18:00 - open end: dinner (followed by activities inside the conference center)**

# Day 2 (Tuesday, January 23, 2024):

- 7:30 - 8:45: Breakfast at the *dinner hall.*
- 8:45 - 9:00: Upload slides and computer test

## *Morning Session 1: AI model evaluation*

- 9:00 - 9:20: Presentation (20 min)
  Nicola Strisciuglio, Shortcut learning and out-of-distribution generalization in computer vision
- 9:20 - 9:40:  Presentation (20 min)
  Han Zhao, Algorithmic fairness, out-of-distribution generalization, trustworthy ML
- 9:40 - 10:20: Information and discussion (40 min)
  - Basic knowledge of related concepts, such as domain gap, out-of-distribution detection, open-world problem, etc…

**10:20 - 10:50: Coffee break at the coffee area**

## *Morning Session 2: other AI topics related to validation / robustness*

- 10:50 - 11:10: Presentation (20 min)
  Chao Chen, Structural Uncertainty for Biomedical Image Analysis
- 11:10 - 11:30: Presentation (20 min)
  Shanghang Zhang, "Towards machine learning generalization in the open world"
- 11:30 - 12:00: Discussion (30 min)

**12:15 - 13:00: Lunch**

## *Afternoon Session 1: foundation models for bioimaging, and ethical issues*

**Part A: Foundation models**

- 13:00 - 13:20: Presentation (20 min)
  Constantin Pape, "SAM for microscopy"
- 13:20 - 13:40: Presentation (20 min)
  Gaole Dai, "Multimodal foundation models for biomedical image analysis"
- 13:40 - 14:10: Discussion (30 min)

**Part B: Ethical issues**

- 14:10 - 14:30: Presentation (20 min)
  Andrew Hickl, "General ethical issues in AI"
- 14:30 - 14:50: Presentation (20 min)
  *TBD (may be used for discussion)*

- 14:50 - 15:30: Discussion and outlooks (40 min)
  - Discussion and outlooks on ethical issues in bioimaging AI
  - Discussion of a potential white paper

**15:30 - 16:00: coffee break**

**16:00 - 16:10: group photo**

## *Afternoon Session 2: Discussion & perspectives*

- 16:10 - 17:10: discussion on validation (focus on performance reporting)
- 17:10 - 18:00: outlooks on validation (focus on performance reporting)
  - Building working groups
  - Planning potential white paper publication
  - Future directions for a broader community

**18:00 - open end: dinner (followed by activities inside the conference center)**

# Day 3 (Wednesday, January 24, 2024):

- 7:30 - 8:45: Breakfast at the *dinner hall.*
- 8:45 - 9:00: Upload slides and computer test

## *Morning Session 1: Discussion & perspectives*

- 9:00 - 9:50: discussion on validation (focus on future research directions)
- 9:50 - 10:40: outlooks on validation (focus on future research directions)
  - Building working groups on important topics
  - Planning potential white paper publication
  - Future directions for a broader community

**10:40 - 11:00: coffee break at the coffee area**

## *Morning Session 2: Strategic planning*

- 11:00 - 12:00: Summary of the discussions and other future plannings
  - Identify next-steps, e.g., action items
  - Strategic planning of follow-up meetings, working groups or collaborations, etc.
- 12:00 - 12:15: Closing remarks

**12:15 - 13:00: Lunch**

- Leave in the afternoon