

# Building-up Differential Homotopy Theory

## 2026 at Shinshu

Date : **Monday 2nd ~ Thursday 5th of March, 2026**

Venue : **Room 1, Faculty of Science, Shinshu University**  
Asahi 3-1-1, Matsumoto 390-8621, Japan.

Access : <https://www.shinshu-u.ac.jp/english/about/map/map04.html>

This workshop is supported by Grant-in-Aid for Scientific Research (B) JP23K20795 (Katsuhiko Kuribayashi) and for Grant-in-Aid for Scientific Research (C) JP23K03093 (Norio Iwase) from JSPS.

### Schedule

#### Monday 2nd of March

- 10:00    Opening
- 10:00 ~ 11:00    **Ling Zhou** (Duke University)  
*Beyond Persistent Homology: Persistent Homotopy-Theoretic Invariants* \*\*\*
- 11:30 ~ 12:30    **Ling Zhou** (Duke University)  
*Beyond Persistent Homology: Persistent Cup Products and Related Invariants* \*\*\*
- 14:00 ~ 15:00    **Shunsuke Tada** (Tohoku University)  
*Stability of Bipath Persistence Diagrams*
- 15:30 ~ 16:30    **Hideto Asashiba** (Shizuoka University, Institute for Advanced Study, KUIAS, Kyoto University, Osaka Central Advanced Mathematical Institute)  
*Relative Koszul coresolutions and relative Betti numbers*

#### Tuesday 3rd of March

- (Morning free)
- 13:25 ~ 13:30    Group Photo (all of us)
- 13:30 ~ 14:30    **Masai Noda** (Shinshu University)  
*An adjunction of the categories of sheaves related to a topology and a differential geometry*

- 14:50 ~ 15:50 **Patrick Iglesias-Zemmour** (The Hebrew University)  
*Geometric Quantization by Paths: From Feynman to Souriau*
- 16:10 ~ 17:10 **Kathrin Welker** (Helmut-Schmidt-University, University of the Federal Armed Forces Hamburg)  
*Optimization on (infinite-dimensional) shape manifolds\*\*\**

### Wednesday 4th of March

- 9:30 ~ 10:30 **David Miyamoto** (Queen's University)  
*Lie's third theorem via elastic diffeological groups*
- 11:00 ~ 12:00 **Masaki Taho** (The university of Tokyo)  
*Various Notions of Tangent Spaces in Diffeology*
- 13:30 ~ 14:30 **Yuki Kojima** (Toyota Systems Corporation)  
*A closed manifold is a fat CW complex*
- 14:50 ~ 15:50 **Patrick Iglesias-Zemmour** (The Hebrew University)  
*Groupoids in Diffeology: The Boman Paradox: When Topology and Algebra do not Define Geometry*
- 16:10 ~ 17:10 **Kathrin Welker** (Helmut-Schmidt-University, University of the Federal Armed Forces Hamburg)  
*Optimization of multiple and non-smooth shapes: towards optimization techniques on diffeological spaces\*\*\**

### Thursday 5th of March

- 10:00 ~ 11:00 **Tadayuki Haraguchi** (Naragakuen University)  
*Cubical cell complexes in the category of diffeological spaces*
- 11:30 ~ 12:30 **David Miyamoto** (Queen's University)  
*Lie's third theorem via elastic diffeological groups*
- 12:30 Closing

#### Organisers:

Katsuhiko Kuribayashi (Shinshu University)  
e-mail: <kurimath@shinshu-u.ac.jp>

Norio Iwase (Kyushu University)  
e-mail: <iwase@math.kyushu-u.ac.jp>