

**CRBM**

Centre de Recherche en Biologie Cellulaire de Montpellier

**UNIVERSITÉ DE
MONTPELLIER**

CRBM external seminar **BIOLuM**

Monday, Mar 27th at 11:00 am Salle Marcel Dorée

How stochasticity can bestow higher scale robustness in embryogenesis

Dimitri FABRÈGES, Asst. Prof. Kyoto University

Group Prof. Hiiragi, Institute for the Advanced Study of Human Biology (WPI-ASHBi) and Department of Developmental Biology of the Graduate School of Medicine, Kyoto University, Kyoto, Japan



Titulaire d'un PhD en Biologie du Développement (2016) obtenu dans le laboratoire Nadine Peyri  ras (BioEmergences), Dimitri Fabr  ges rejoint l'  quipe de Takashi Hiiragi    l'EMBL    Heidelberg, Allemagne. Il suivra le laboratoire jusqu'   l'Institut Hubrecht aux Pays-Bas, o   il pr  parera la mise en place d'une plateforme d'analyse quantitative d'images et de donn  es de recherches. En 2025, il rejoint le d  partement de Biologie de D  veloppement de l'Universit   de Kyoto en tant qu'Assistant Professor.

His research focuses on understanding the impact of variability between and within embryos during early morphogenesis, and how embryos integrate stochastic processes into deterministic behaviors at a larger scale. Specifically, Dimitri aims to develop a predictive model of mouse pre-implantation embryogenesis by quantifying cell shape, connectivity, dynamics, and gene expression, combined with experimental perturbations. These questions have led him to work in an interdisciplinary environment that integrates experimental characterization, theoretical analysis, simulations, predictions, and experimental validation. Ultimately, the overarching questions is to understand how intrinsically stochastic systems exhibiting great variations can generate a robust and predictable outcome.

In parallel, he is establishing a Research Data Analysis and Quantification facility at the Hubrecht Institute, to support research groups and promote quantitative analysis and theoretical approaches in experimental biology.

Selected publications

- **Temporal variability and cell mechanics control robustness in mammalian embryogenesis**
Fabr  ges D, Corominas-Murtra B, Moghe P, Kickuth A, Ichikawa T, Iwatani C, Tsukiyama T, Daniel N, Gering J, Stokkermans A, Wolny A, Kreshuk A, Duranthon V, Uhlmann V, Hannezo E and Hiiragi T
Science (Oct. 2024), [doi:10.1126/science.adh1145](https://doi.org/10.1126/science.adh1145)
- **An ex vivo system to study cellular dynamics underlying mouse peri-implantation development**
Ichikawa T, Zhang HT, Panavaite L, Erzberger A, Fabr  ges D, Snajder R, Wolny A, Korotkevich E, Tsuchida-Straeten N, Hufnagel L, Kreshuk A and Hiiragi T
Developmental Cell (Feb. 2022), [doi:10.1016/j.devcel.2021.12.023](https://doi.org/10.1016/j.devcel.2021.12.023)
- **Control of the proportion of inner cells by asymmetric divisions and the ensuing resilience of cloned rabbit embryos**
Fabr  ges D, Daniel N, Duranthon V and Peyri  ras N
Development (Mar. 2018), [doi:10.1242/dev.152041](https://doi.org/10.1242/dev.152041)