

SMBE Satellite Meeting on

Origin, Maintenance, and Evolution of Biological Noise

3rd - 5th June 2025, Tübingen, Germany

Organizers

Luisa F. Pallares (*Friedrich Miescher Laboratory of the Max Planck Society, Tübingen, Germany*)

Julien Dutheil (*Max Planck Institute for Evolutionary Biology, Plön, Germany*)

Ignacio Bravo (*CNRS, Montpellier, France*)

Daniel Weinreich (*Brown University, USA*)

Why this meeting?

Noise is a fundamental, yet long understudied, aspect of biology. **The goal of this symposium is to bring together researchers working on noise from different fields** (e.g., theoreticians, molecular biologists, population geneticists, system biologists, philosophers) in order to establish the common principles guiding the origin, maintenance, and evolution of biological noise at distinct organization levels, from molecules, to transcriptional networks, to higher-order phenotypes, to populations.

Depending on the field, biological noise is thought of as plasticity, robustness, variance, variability, or simply as noise. Decades of conceptual approaches to noise have recently given way to technological advances that have allowed the quantification of biological noise at different levels of biological organization. However, key questions remain: What do we talk about when we talk about biological noise? Do the manifestations of noise across organization levels represent a common evolutionary phenomenon despite the vast diversity of mechanistic differences?

We hope that this first ‘noise’ meeting serves as a platform to develop a framework to understand the origin, maintenance, and evolution of biological noise. And, that it facilitates the consolidation of a diverse community of researchers focused on the study of biological noise.

Attendees

43 people from 12 countries and 24 institutions attended the meeting (estimation based on name: 42% female, 58% male). All career stages were represented (38% PhD students, 38% PI, and 24% postdocs). There was one plenary talk by Francesca Merlin (CNRS, Paris), and one

keynote speaker for each of the four sessions: Maria Carmo-Fonseca (University of Lisbon), Patricia Wittkopp (University of Michigan), Ben de Bivort (Harvard, USA), and Daniel Weinreich (Brown University, USA). The attendees contributed 12 talks and 23 posters. There was a dedicated discussion session for each of the four topics in which the meeting was divided (see program below).

Thanks to additional funding provided by Brown University, we were able to cover part of the accommodation, registration, and transportation for Early Career Scientists (ECS) who applied for financial support. The registration fee was also adjusted down to promote ECS attendance (100 Euros), and compensated by the registration fee of PIs (300 Euros).

When agreed by the speakers, the talks were live-streamed, and they will be hosted in the meeting webpage in the coming month. The abstracts are also available in the webpage.

Webpage

<https://pallareslab.github.io/bionoise2025/index.html>

Budget

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SMBE (90%)		14544
SMBE (10%)		1616
Registrations		5800
Brown University		4249
Max Planck Society		727
Stocherkahn (social activity)	440	
Conferencer room rental + catering	9573	
Dinners	2743	
Welcome cocktail	1022	
Invited speakers (travel, accommodation)	9112	
Funding for Early Career Researchers	4045	
Total	26936	26936



Program

2nd June [Mon]

18:00 Welcome cocktail & snacks
 Location: MPI for Biology, *Max-Planck-Ring 5, 72076 Tübingen*

3rd June [Tue]

Session 0 | Philosophy of biological noise

08:45 – 09:00	Welcome
09:00 – 10:00	Plenary talk: Stochasticity in Biology: a Philosophical Analysis of its Potential Explanatory Role [Francesca Merlin]
10:00 – 10:20	Understanding gene expression “by chance” [Marco Casali]
10:20 – 10:50	Coffee break

Session 1 | Non-genetic inheritance of phenotypic noise

Chair: Ignacio Bravo

10:50 – 11:50	Keynote: From Splicing Noise to Disease: When Errors Matter [Maria Carmo-Fonseca]
11:50 – 12:10	Epigenetic switching as an adaptive strategy: harnessing biochemical noise and other evolutionary trade-offs [Mariana Gómez-Schiavon]
12:10 – 12:30	Beyond the Egg: Hidden Impact of Maternal Contribution Variability [Anastasiia Berezenko]
12:30 – 14:00	Lunch
14:00 – 15:00	Poster session 1
15:00 – 16:00	Discussion
16:00 – 16:30	Coffee break
17:00 – 18:00	Social activity [Stocherkahn ride] Location: River bank, next to Neckawa
18:00	Dinner Location: Neckawa Biergarten, <i>Wöhrdstraße 25, 72072 Tübingen</i>

4th June [Wed]

Session 2 | The genetic basis of phenotypic noise

Chair: Julien Dutheil

09:00 – 10:00	Keynote: Evolution of Regulatory Networks Controlling Plasticity in Gene Expression between <i>Saccharomyces cerevisiae</i> and <i>Saccharomyces paradoxus</i> [Patricia Wittkopp]
10:00 – 10:30	Coffee break
10:30 – 10:50	The rate and molecular mechanisms underlying the evolution of gene expression noise [Brian Metzger]
10:50 – 11:10	Trans-acting mutations reveal genetic modulators of intrinsic and extrinsic gene expression noise [Fabien Duveau]

11:10 – 11:30	The costs and benefits of altered translation accuracy during bacterial adaptation to antibiotics [Laasya Samhita]
11:30 – 12:30	Poster session 2
12:30 – 14:00	Lunch
14:00 – 15:00	Discussion

Session 3 | The organismal implications of phenotypic noise

Chair: Luisa Pallares

15:00 – 16:00	Keynote: Drift in Individual Behavioral Phenotype as a Strategy for Unpredictable Worlds [Benjamin de Bivort]
16:00 – 16:30	Coffee break
16:30 – 16:50	Phenotypic plasticity, epigenetics and the inheritance of non-genetic information in a predatory nematode [Ralf Sommer]
16:50 – 17:10	Establishment, maintenance and consequences of inter-individual transcriptional variability in plants [Sandra Cortijo]
17:10 – 17:30	Sex-Specific Effects of Developmental Temperature on Dorsal Cluster Neuron Variability, Wiring Asymmetry, and Behavior [Mohammad Amine Reslan]
17:30 – 19:00	Free time
19:00	Dinner Location: 1821, <i>Wilhelmstraße 3</i> , 72074 Tübingen

5th June [Thu]

Session 3 | The organismal implications of phenotypic noise (continuation)

Chair: Luisa Pallares

09:00 – 10:00	Poster session 3
10:00 – 10:30	Coffee break
10:30 – 11:30	Discussion

Session 4 | Population genetics of phenotypic noise

Chair: Daniel Weinreich

11:30 – 12:30	Keynote: The Population Genetics of Biological Noise [Daniel Weinreich]
12:30	Group picture
12:30 – 14:00	Lunch
14:00 – 14:20	Proliferation variability and fate of mutators generated de novo by optogenetics [Gael Yvert]
14:20 – 14:40	A simple null model captures key features of non-deterministic genotype-phenotype maps [Nora Martin]
14:40 – 15:00	Optimal division asymmetry and fitness effects of noisy transcription and growth in <i>E. coli</i> [Ulrich Steiner]
15:00 – 16:00	Poster session 4
16:00 – 17:00	Discussion
17:00 – 17:30	Coffee break
17:30	Final discussion & wrap-up
19:00	Conference dinner Location: Historische Weinstube Forelle, <i>Kronenstraße 8, 72070 Tübingen</i>