

CURRICULUM VITAE

Name: **Johannes Jaeger**
Date of Birth: March 17th, 1973
Place of Birth: Chur, Switzerland
Nationality: Swiss
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Google Scholar: <https://scholar.google.at/citations?user=Wk8kppcAAAAJ>
YouTube (lectures): <https://www.youtube.com/channel/UCStM7WbWmY1UZsg5nHdUuGA>
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Vision Statement: I am a freelance evolutionary systems biologist and philosopher with an extremely transdisciplinary track record. My research, first as the leader of an empirical research group, later as the director of an institute for the philosophy of biology, has always focused around a process perspective on the organism and its evolution. I am interested in fundamental questions such as the limits of (genetic) reductionism, dynamical systems modeling, and mechanistic explanation in biology. My current projects deal with the use of models as epistemic tools, with causality in complex adaptive systems, and with the nature of organismic agency and its role evolution. In recent years, I have also developed an interest in promoting open science and open innovation. Crossing disciplinary boundaries between biology, mathematics, and philosophy is an essential aspect of my work. Teaching and mentoring are my passions. I have a talent for facilitating interdisciplinary interactions, and a proven track record for building a supportive, productive, and creative academic environment.

Professional Experience

2017– **Associate Faculty**, Complexity Science Hub (CSH) Vienna, Austria
2020/21 **D’Alembert Fellow**, Paris-Saclay/Institut d’Études Avancées (IEA) de Paris, France
2020 **Fellow**, Stellenbosch Institute for Advanced Study (STIAS), South Africa
2018–2020 **Guest Lecturer (Gastprofessor)**, Dept of Mol Evol & Dev, Univ of Vienna, Austria
2018/19 **Fellow**, Centre de Recherches Interdisciplinaires (CRI), Paris, France
2017/18 **Visiting Scholar**, Center for Systems Biology Dresden (CSBD), Germany
2015–2017 **Scientific Director**, Konrad Lorenz Institute for Evolution & Cognition Research, KLI Klosterneuburg, Austria
2014/15 **Fellow**, Institute for Advanced Study/Wissenschaftskolleg zu Berlin
Focus Group: “Gene Regulation and Organismal Diversity”
Organiser: Steve Frank; with: Orkun Soyer, Thomas Pfeiffer, Anton Crombach
2008–2015 **Group Leader**
Comparative Analysis of Developmental Systems
EMBL/CRG Research Unit in Systems Biology
Centre de Regulació Genòmica (CRG), Barcelona, Spain
2006–2008 **Postdoctoral Research Associate**
Laboratory for Development & Evolution, University Museum of Zoology
Department of Zoology, University of Cambridge, UK
Project: “A Comparative Gene Circuit Approach to Study the Evolution of Segmentation in Insects”
Principal Investigators: Prof. Michael Akam & Dr. Nick Monk

Education

- 2000–2005 **PhD, Graduate Program in Genetics**
Dept of Applied Mathematics & Statistics, and Center for Developmental Genetics, Stony Brook University, Stony Brook, NY, USA
Thesis: “Dynamic Regulatory Analysis of the Gap Gene Network in *Drosophila melanogaster*”
Under the supervision of: Prof. John Reinitz
- 1999–2000 **MSc in Holistic Science**
Schumacher College, Dartington, Devon, UK
Thesis: “A Cellular Oscillator Model of Animal Segmentation”
Under the supervision of: Prof. Brian Goodwin
Distinction
- 1996–1999 **University Diploma in Biology**
Biocenter, University of Basel, Switzerland
Thesis: “Apoptosis and Homeosis in the *Drosophila* Eye Imaginal Disc”
Under the supervision of: Prof. W. J. Gehring
Final Grade: 5.4 (out of 6)

Awards & Fellowships

- 2020/21 **Jean D’Alembert Research Chair**
Université Paris-Saclay/Institut d’Études Avancées (IEA) Paris, France
- 2020 **Fellowship**
Stellenbosch Institute for Advanced Study (STIAS), Stellenbosch, South Africa
- 2019 **Dr. Chopin Visiting Professorship**
Webster Private University, Vienna, Austria
- 2018/19 **Short-Term Fellowship**
Centre de Recherches Interdisciplinaires (CRI), Paris, France
- 2017/18 **Visiting Fellowship**
Center for Systems Biology Dresden (CSDB), Dresden, Germany
- 2014/15 **Fellowship**
Institute for Advanced Study/Wissenschaftskolleg zu Berlin, Germany
- 2013 **President’s Medal**, Section: Cell Biology, Society for Experimental Biology (SEB)
Awarded at the SEB Annual Meeting 2013 in Valencia, Spain
- 1999–2000 **Graduate Fellowship** from the Roche Research Foundation, Basel, Switzerland

Management Training

- 2011 **Leading for Success in Science (Advanced Course)**
- 2009 **Leading for Success in Science**
taught by S. Kocevar & T. Frick, hfp consulting, Centre de Regulació Genòmica (CRG), Barcelona, Spain (3-day intensive courses in lab management)

Selected Courses/Workshops Attended

- 2003 **Complex Systems Summer School**
Santa Fe Institute, organized by J. Shapiro, Santa Fe, NM, USA
- 2001 **From Individual to Collective Behaviour in Biological Systems**
Newton Institute for Mathematical Science Scientific Programme, organized by P.K. Maini, H. Othmer, T.J. Pedley & B.D. Sleeman, Cambridge, UK

Publications

- 2021 **Jaeger J.**, DiFrisco J., Monk N. The ontology of dynamical systems. (in preparation).
- Jaeger J.**, Masselot C., Greshake Tzovaras B., Senabre Hidalgo E., Santolini M. An epistemology for democratic citizen science. (in preparation).
- Jaeger J.**, Loettgers A., Knuuttila, T. Evolutionary innovation and the co-construction of possibility spaces. (in preparation).
- Jaeger J.**, Loettgers A., Knuuttila, T. Expanding possibility spaces as tools in modeling practice. (in preparation).
- Jaeger J.**, DiFrisco J., Loettgers A. Beyond networks: dynamical explanations in the natural and social sciences. (commissioned as a book chapter, in preparation).
- Jaeger J.** Ontogeny and biological organization. (commissioned as a book chapter, in preparation).
- Torri A., **Jaeger J.**, Pradeu T., Saleh M.-C. On the origin of RNA interference and its effects. *PLoS Biology* (submitted).
- Jaeger J.** The Fourth Perspective: evolution and organismal agency. In: *Organization in Biology*, Mossio M (ed.), Springer, Berlin (in press, [preprint](#)).
- Crombach A, **Jaeger J.** Life's attractors continued: progress in understanding developmental systems through reverse engineering and *in silico* evolution. In: *Evolutionary Systems Biology: Advances, Questions, and Opportunities*, Crombach A (ed.), Springer Nature Switzerland, Cham ([preprint](#)).
- Jaeger J.** Dynamical modularity of the genotype-phenotype map. In: *Evolutionary Systems Biology: Advances, Questions, and Opportunities*, Crombach A (ed.), Springer Nature Switzerland, Cham ([preprint](#)).
- Jaeger J.**, Monk N. Dynamical modules in metabolism, cell and developmental biology. *J Roy Soc Interface* 11: 20210011. ([preprint](#))
- DiFrisco J, **Jaeger J.** Homology of processes: developmental dynamics in comparative biology. *J Roy Soc Interface* 11: 20210007. ([preprint](#)).
- 2020 DiFrisco J, **Jaeger J.** Genetic causation in complex regulatory systems: an integrative dynamic perspective. *BioEssays* 42: 1900226.
- Jaeger J.**, Verd B. Dynamic positional information: patterning mechanism vs. precision in gradient-driven systems. *Current Topics in Developmental Biology* 137: 219–246.
- Anderson G, Verd B & **Jaeger J.** Drawing to extend Waddington's Epigenetic Landscape. *Leonardo* 53: 1–14.
- 2019 DiFrisco J, **Jaeger J.** Beyond networks: mechanism and process in evo-devo. *Biol Phil* 34: 54.
- Verd B, Monk N & **Jaeger J.** Modularity, criticality and evolvability of a developmental gene regulatory network. *eLIFE* 8: e42832.
- Jaeger J.** Dynamic structures in evo-devo: from morphogenetic fields to evolving organisms. In: *Perspectives on Evolutionary and Developmental Biology: essays for Alessandro Minelli*, Fusco G (ed.), Padua Univ Press, Padua. ([preprint](#))
- 2018 Verd B, Clark E, Wotton KR, Janssens H, Jiménez-Guri E, Crombach A & **Jaeger J.** A damped oscillator imposes temporal order on posterior gap gene expression in *Drosophila*. *PLOS Biology* 16: e2003174.
- Fraire-Zamora JJ, **Jaeger J.**, Solon J. Two consecutive microtubule-based epithelial seaming events mediate dorsal closure in the scuttle fly *Megaselia abdita*. *eLIFE* 7: e33807.

- 2018 JiméneZ-Guri E, Wotton KR & **Jaeger J**. *tarsal-less* is expressed as a gap gene but has no gap gene phenotype in the moth midge *Clogmia albipunctata*. *Open Science* 5: 180458.
- Jaeger J**. Shift happens: the developmental and evolutionary dynamics of the gap gene system. *Curr Op Syst Biol* 11: 65–73.
- Jaeger J**. Foreword to: *Everything Flows: Towards a Processual Philosophy of Biology*, Nicholson D, Dupré J. (eds), Oxford Univ Press, Oxford.
- 2017 Wotton KR, Alcaine Colet A, **Jaeger J** & JiméneZ-Guri E. Non-canonical dorso-ventral patterning in the moth midge *Clogmia albipunctata*. *EvoDevo* 8: 20.
- Verd B, Crombach A & **Jaeger J**. Dynamic maternal gradients control timing and shift-rates for *Drosophila* gap gene expression. *PLoS Comp Biol* 13: e1005285.
- Jaeger J**. The importance of being dynamic: systems biology beyond the hairball. In: *Philosophy of Systems Biology: Perspectives from Philosophers and Scientists*, Green S (ed.), Springer, Berlin.
- 2016 Crombach A, Wotton KR, JiméneZ-Guri E & **Jaeger J**. Gap gene regulatory dynamics evolve along a genotype network. *Mol Biol Evol* 33: 1293–1307.
- Hoermann A, Cicin-Sain D & **Jaeger J**. A quantitative validated model reveals two phases of transcriptional regulation for the gap gene *giant* in *Drosophila*. *Dev Biol* 411: 325–38.
- 2015 Wotton KR, JiméneZ-Guri E, Crombach A, Janssens H, Alcaine Colet A, Lemke S, Schmidt-Ott U & **Jaeger J**. Quantitative system drift compensates for altered maternal inputs to the gap gene network of the scuttle fly *Megaselia abdita*. *eLIFE* 4: e04785.
- Wotton KR, JiméneZ-Guri E & **Jaeger J**. Maternal co-ordinate gene regulation and axis polarity in the scuttle fly *Megaselia abdita*. *PLoS Genet* 11: e1005042.
- Wotton KR, JiméneZ-Guri E, Crombach A, Cicin-Sain D & **Jaeger J**. High-resolution gene expression data from blastoderm embryos of the scuttle fly *Megaselia abdita*. *Sci Data* 2:150005.
- Cicin-Sain D, Hermoso Pulido A, Crombach A, Wotton KR, JiméneZ-Guri E, Taly J-F, Roma G & **Jaeger J**. SuperFly: a comparative database for quantified spatio-temporal gene expression patterns in early dipteran embryos. *Nucl Acids Res* 43 (Database Issue): D752–6.
- Jaeger J** & Monk N. Everything flows: a process perspective on life. *EMBO Rep* 16: 1064–7.
- Jaeger J**, Laubichler M & Callebaut W. The comet cometh: evolving developmental systems. *Biol Theory* 10: 36–49.
- Green S, Fagan M & **Jaeger J**. Explanatory integration challenges in evolutionary systems biology. *Biol Theory* 10: 18–35.
- Villaverde AF, Henriques D, Smallbone K, Bongard S, Schmid J, Cicin-Sain D, Crombach A, Saez-Rodriguez J, Mauch K, Balsa-Canto E, Mendes P, **Jaeger J** & Banga JR. BioPreDyn-bench: a suite of benchmark problems for dynamic modelling in systems biology. *BMC Syst Biol* 9: 8.
- 2014 **Jaeger J** & Sharpe J. On the concept of mechanism in development. In: *Towards a Theory of Development*, Minelli A & Pradeau T (eds), Oxford Univ Press, Oxford.
- Jaeger J** & Monk N. Bioattractors: dynamical systems theory and the evolution of regulatory processes. *J Physiol* 592: 2267–81.
- Crombach A, García-Solache M & **Jaeger J**. Evolution of early development in dipterans: reverse-engineering the gap gene network in the moth midge *Clogmia albipunctata* (Psychodidae). *BioSystems* 123: 75–85.

- 2014 Verd B, Crombach A & **Jaeger J**. Classification of transient behaviours in a time-dependent toggle switch model. *BMC Syst Biol* 8: 43.
- Jiménez-Guri E, Wotton KR, Gavilán B & **Jaeger J**. A staging scheme for the development of the moth midge *Clogmia albipunctata*. *PLOS ONE* 9: e84422.
- Wotton KR, Jiménez-Guri E, García Matheu B & **Jaeger J**. A staging scheme for the development of the scuttle fly *Megaselia abdita*. *PLOS ONE* 9: e84421.
- 2013 Janssens H, Siggins K, Cicin-Sain D, Jiménez-Guri E, Musy M, Akam M & **Jaeger J**. A quantitative atlas of Even-Skipped and Hunchback expression in *Clogmia albipunctata* (Diptera: Psychodidae) blastoderm embryos. *EvoDevo* 5: 1.
- Becker K, Balsa-Canto E, Cicin-Sain D, Hoermann A, Janssens H, Banga JR, **Jaeger J**. Reverse-engineering post-transcriptional regulation of gap genes in *Drosophila melanogaster*. *PLoS Comp Biol* 9: e1003281.
- Wotton KR, Alcaine Colet A, **Jaeger J** & Jiménez-Guri E. Reconstructing the BMP family tree in flies. *Dev Genes Evol* 223: 335–40.
- Janssens H, Crombach A, Wotton KR, Cicin-Sain D, Surkova S, Lim CL, Samsonova M, Akam M & **Jaeger J**. Lack of *tailless* leads to an increase in expression variability in *Drosophila* embryos. *Dev Biol* 377: 305–317.
- Jiménez-Guri E, Huerta-Cepas J, Cozzuto L, Wotton KR, Kang H, Himmelbauer H, Roma G, Gabaldón T, **Jaeger J**. Comparative transcriptomics of early dipteran development. *BMC Genomics* 14: 123.
- Jaeger J** & Monk N. Keeping the gene in its place. In: *The Intuitive Way of Knowing: A Tribute to Brian Goodwin*, Lambert D & Chetland C (eds), Floris, Edinburgh.
- 2012 Crombach A, Wotton KR, Cicin-Sain D, Ashyraliyev M & **Jaeger J**. Efficient reverse-engineering of a developmental gene regulatory network. *PLoS Comp Biol* 8: e1002589.
- Crombach A, Cicin-Sain D, Wotton KR & **Jaeger J**. Medium-throughput processing of whole mount *in situ* hybridisation experiments into gene expression domains. *PLoS ONE* 7: e46658.
- Jaeger J** & Crombach A. Life's attractors: understanding developmental systems through reverse engineering and in silico evolution. In: *Evolutionary Systems Biology*, Soyer O (ed.), Springer, Berlin.
- Jaeger J**, Irons D & Monk N. The inheritance of process: a dynamical systems approach. *J Exp Zool (Mol Dev Evol)* 318B: 591–612.
- Jaeger J**, Manu & Reinitz J. *Drosophila* blastoderm patterning. *Curr Op Genes Dev* 22: 533–41.
- 2011 **Jaeger J**. The gap gene network. *Cell Mol Life Sci* 68: 243–74.2012
- 2010 García-Solache M, **Jaeger J** & Akam M. A systematic analysis of the gap gene system in the moth midge *Clogmia albipunctata*. *Dev Biol* 344: 308–18.
- Jostins L & **Jaeger J**. Reverse engineering a gene network using an asynchronous parallel evolution strategy. *BMC Syst Biol* 4:17.
- Jaeger J** & Monk NAM. Reverse engineering of gene regulatory networks. In: *Learning and Inference in Computational Systems Biology*, Lawrence ND, Girolami M, Rattray M & Sanguinetti G (eds), MIT Press, Cambridge, MA.
- Jaeger J**. A matter of timing and precision. *Mol Syst Biol* 6: 427. (comment on: Morton de Lachapelle A & Bergmann S (2010). *Mol Syst Biol* 6: 351.)
- Jaeger J**. Neither fish nor fowl: review of *The Algorithmic Beauty of Sea Shells*, 4th ed. by Hans Meinhardt. *BioEssays* 32: 638–40.

- 2009 Ashyraliyev M, Siggens K, Janssens H, Blom J, Akam M & **Jaeger J**. Gene circuit analysis of the terminal gap gene *huckebein*. *PLoS Comp Biol* 5: e10000548.
Jaeger J. Modelling the *Drosophila* embryo. *Mol BioSyst* 5: 1549–68.
- 2009 **Jaeger J** & Martinez-Arias A. Getting the measure of positional information. *PLoS Biology* 7: e1000081.
- 2008 **Jaeger J**, Irons D & Monk N. Regulative feedback in pattern formation: towards a general relativistic theory of positional information. *Development* 135: 3175–83.
Ashyraliyev M, **Jaeger J** & Blom J. Parameter estimation and determinability analysis applied to *Drosophila* gap gene circuits. *BMC Syst Biol* 2: 83.
- 2007 **Jaeger J**, Sharp DH & Reinitz J. Known maternal gradients are not sufficient for the establishment of gap domains in *Drosophila melanogaster*. *Mech Dev* 124: 108–28.
- 2006 **Jaeger J** & Reinitz J. On the dynamic nature of positional information. *BioEssays* 28: 1102–11.
Janssens H, Hou S, **Jaeger J**, Kim A-R, Myasnikova E, Sharp DH & Reinitz J. Quantitative and predictive model of transcriptional control of the *Drosophila melanogaster* *even skipped* gene. *Nat Genet* 38: 1159–65.
Perkins TJ, **Jaeger J**, Reinitz J & Glass L. Reverse engineering the gap gene network of *Drosophila melanogaster*. *PLoS Comp Biol* 2: e51.
- 2005 Janssens H, Kosman D, Vanario-Alonso CE, **Jaeger J**, Samsonova M & Reinitz J. A high-throughput method for quantifying gene expression data from early *Drosophila* embryos. *Dev Genes Evol* 215: 374–81.
- 2004 **Jaeger J**, Surkova S, Blagov M, Janssens H, Kosman D, Kozlov KN, Manu, Myasnikova E, Vanario-Alonso CE, Samsonova M, Sharp DH & Reinitz J. Dynamic control of positional information in the early *Drosophila* blastoderm. *Nature* 430: 368–71.
Jaeger J, Blagov M, Kosman D, Kozlov KN, Manu, Myasnikova E, Surkova S, Vanario-Alonso, CE, Samsonova M, Sharp DH & Reinitz J. Dynamical analysis of regulatory interactions in the gap gene system of *Drosophila melanogaster*. *Genetics* 167: 1721–37.
Gursky VV, **Jaeger J**, Kozlov KN, Reinitz J & Samsonov AM. Pattern formation and nuclear divisions are uncoupled in *Drosophila* segmentation: Comparison of spatially discrete and continuous models. *Physica D* 193: 286–302.
Punzo C, Plaza S, Seimiya M, Schnupf P, Kurata S, **Jaeger J** & Gehring WJ. Functional divergence between *eyeless* and *twin of eyeless* in *Drosophila melanogaster*. *Development* 131: 3943–53.
- 2002 **Jaeger J** & Goodwin BC. Cellular oscillators in animal segmentation. *In Silico Biol* 2: 111–23.
- 2001 **Jaeger J** & Goodwin BC. A cellular oscillator model for periodic pattern formation. *J Theor Biol* 213: 171–81.
Plaza S, Prince F, **Jaeger J**, Kloter U, Flister S, Benassayag C, Cribbs D & Gehring WJ. Molecular basis for the inhibition of *Drosophila* eye development by Antennapedia. *EMBO J* 20: 802–11.

Research Grants

- 2020–2021 **Partner**, European Commission, Horizon 2020 Project No. 872944
Acronym: CROWD4SDG, Citizen Science for Monitoring Climate Impacts and Achieving Climate Resilience
- 2011–2015 **Coordinator**, European Commission, 7th Framework Programme: Knowledge-Based Bio-Economy (KBBE), Project No. 289434, Acronym: BioPreDyn,
From Data to Models: New Bioinformatics Methods and Tools for Data-Driven, Predictive Dynamic Modelling in Biotechnological Applications
- 2010–2015 **Principal Investigator**, Spanish Ministry of Science and Innovation (MICINN), Grants BFU2009-10184 & BFU2012-33775, Evolutionary and Developmental Dynamics of the Gap Gene Network
- 2010–2013 **Partner**, ERANet: ERASysBio+ (Ref. No. EUI2009-04045), Modelling the genetic network controlling heart development using the model organism *Drosophila melanogaster* (MODHEART)
- 2010–2013 **Partner**, ComplexityNET (Ref. No. PIM2010ERC-00293), Multi-objective optimization for modeling developmental gene regulatory networks (MOPDEV)
- 2009–2011 **Principal Investigator**, Catalan Agency for Scientific Research (AGAUR), SGR Grant 406, Comparative Analysis of Developmental Systems
- 2006–2009 **Recognised Researcher**, BBSRC Grant BBID00051311, A Comparative Gene Circuit Approach to Study the Evolution of Segmentation in Insects
[I wrote this grant and was solely responsible for its scientific content.]

Workshops Designed and Taught

- 2019– **Science as progress & perspective:** a crash course in the philosophy of science for researcher in the natural, formal, and social sciences
- Centre de Recherches Interdisciplinaires (CRI), Paris, FR
- Institute for Science and Technology (IST), Klosterneuburg, AT
- 2020 **Co-Creation & Co-Design**, with Lukas Zenk, Donauuniversität Krems, AT
- 2019 **Escaping the Grid**, Arts & Science Workshop with Sèpànd Danesh
- Centre de Recherches Interdisciplinaires (CRI), Paris, FR
- Webster Private University Vienna, AT
- What is life?**, Workshop for PhD Students
- Centre de Recherches Interdisciplinaires (CRI), Paris, FR

Other Teaching Experience

- 2019– **Mentor/Teacher**, “CIRP Student Retreat”, CRI Paris, FR
- 2018–2020 **Guest Lecturer (Gastprofessor):** Masters Programme in Evolutionary Systems Biology, Dept. of Molecular Development & Evolution, University of Vienna, AT
Lecture: “Beyond Networks: The Evolution of Dynamic Regulatory Systems”
Seminar: “Current Topics in Evolutionary Systems Biology”
- 2019/2020 **Guest Lecturer (Gastprofessor):** Dept. Of Mol Dev & Evol, University of Vienna, AT
Lecture: “Introduction to Developmental Biology” (Undergraduate Level)
Lecture: “Introduction to Evo-Devo” (MSc Level)
- 2019 **Visiting Professorship**, “Into the Unknown: Open Inquiry & Radical Innovation”
Lecture, Seminar & Workshop, Webster Private University Vienna, Austria
- 2012– **Invited Lecturer:** Experimental Approaches Course, Wellcome PhD Programme in Developmental Biology, University of Cambridge, UK
- 2010– **Invited Lecturer:** Graduate Course on Eco-Evo-Devo, Instituto Gulbenkian de Ciência, Lisbon, PT
- 2012–2016 **Invited Lecturer:** Postgraduate Summer School in Eco-Evo-Devo, Oxford Brookes University, Oxford, UK
- 2012–2015 **Invited Lecturer:** Masters in Genetics and Genomics, Dept. of Genetics, Universitat de Barcelona, ES
- 2012–2014 **Invited Lecturer:** Masters Course in Animal and Plant Morphogenesis, École Normale Supérieure (ENS), Hameau de l'Étoile, Montpellier, FR
- 2009–2015 **Lecturer:** Advanced Seminars in Biomedical Research (First Year PhD Course), Centre de Regulació Genòmica (CRG), Universitat Pompeu Fabra, Barcelona, ES
- 2015 **Invited Lecturer:** Multi-level Modelling of Morphogenesis (EMBO Practical Course), John Innes Centre, Norwich, UK
- 2011–2013 **Teacher:** MSc in Holistic Science, Schumacher College, Dartington, Devon, UK
- 2011 **Teacher:** Summer Course in Genomic Logic, organized by the Centro Andaluz de Biología del Desarrollo (CABD), Carmona, ES
- 2011 **Teacher:** A Science of Qualities: Celebrating Brian Goodwin’s Vision, Schumacher College, Dartington, Devon, UK
- 2009 **Invited Lecturer:** Summer School on Evo-Devo, Istituto Veneto di Scienze, Lettere ed Arti, Venice, IT
- 2008 **Lecturer & Supervisor:** L5 Genes, Genomes & Animal Evolution (Final Year, Undergraduate Course), Department of Zoology, University of Cambridge, UK
- 2000/2001 **Teaching Assistant:** Techniques in Molecular and Cellular Biology (BIO311), & Developmental Genetics (BIO327), Stony Brook University, Stony Brook, NY, USA

Supervised Theses

- 2021 **Co-Supervisor** of Paul Poledna, MSc Department of Philosophy,
University of Vienna, Vienna, Austria
- 2019– **Supervisor** of Anna Riedl, MSc Cognitive Science,
University of Vienna, Vienna, Austria
- 2019 **Supervisor** of Thibault Ponchon, M2 (MSc) Internship,
Centre de Recherches Interdisciplinaires (CRI), Paris, France
- 2011–2016 **Supervisor** of Berta Verd, PhD Thesis Project,
Centre de Regulació Genòmica (CRG), Universitat Pompeu Fabra, Barcelona, Spain
- 2009–2014 **Supervisor** of Astrid Hörmann, PhD Thesis Project,
Centre de Regulació Genòmica (CRG), Universitat Pompeu Fabra, Barcelona, Spain
- 2012 **Co-Supervisor** of Kolja Becker (Undergraduate Diploma/MSc Project), University
of Mainz, DE, and Centre de Regulació Genòmica (CRG), Barcelona, Spain
- 2006–2008 **Co-Supervisor** of Monica García-Solache (PhD Thesis Project), Luke Jostins
(MPhil Computational Biology) & Chea L. Lim (Undergraduate Research Project),
Department of Zoology, University of Cambridge, UK

Conferences/Workshops/Seminars Organized

- 2019/22 **Organizer** (with Berta Verd, James DiFrisco),
FEBS/EMBO Lecture Course: Venice Summer School in Evo-Devo
Centro Culturale Don Orione Artigianelli, Venice, Italy
- 2019 **Co-organizer** (with James DiFrisco)
Symposium: “From Gene Regulatory Networks to Dynamic Mechanistic Explanations”
Intl Society for the History, Philosophy, and the Social Studies of Biology (IHSPSSB)
Oslo, Norway
- 2011–2017 **Director** (organisers: Alessandro Minelli, Gerd Müller, Giuseppe Fusco),
Summer School in Evolutionary Developmental Biology
Istituto Veneto di Scienze Lettere ed Arti, Venice, Italy
- 2017 **Organizer** (with Peter Slood, Jaap Kaandorp, Gemma Anderson, Hester Breman),
Lorentz Center Workshop “On Growth and Form 2017”
Leiden, The Netherlands
- 2016 **Organizer** (with Joanna Masel), 1st KLI Science Forum
“Two sides of the same coin: mechanistic and population-level perspectives
on evolution”, KLI Klosterneuburg, Austria
- 2016 **Organizer**, Symposium “Process Thinking for Evo-Devo”
Euro-Evo-Devo 2016, Uppsala, Sweden
- 2015 **Organizer** (with Verônica Grieneisen & Nick Monk), “The Process View of Life”
Session at the Annual Meeting of the Society for Experimental Biology 2015
in Prague, Czech Republic
- 2011 – 2014 **Organizer** (with Matthieu Louis, James Sharpe & Hilde Janssens), Annual
CRG/EMBL Summer Course in Systems Biology, Barcelona, Spain
- 2012 **Organizer** (with Eileen Furlong, EMBL Heidelberg), ESF/EMBO Research
Conference on “The Systems Biology of *Drosophila* Development”, Polonia Castle,
Pułtusk, Poland
- 2011 **Organizer** (with Bart Deplancke & Alex Stark), 1st Junior European *Drosophila*
Investigators (JEDI) Conference, Leysin, Switzerland
- 2010 **Organizer** (with Ben Lehner), 1st CRG/EMBL Workshop on “The Evolution of
Biological Networks”, Barcelona, Spain
- 2006–2008 **Organizer** (with Beverly Glover), Seminar Series in Evolution & Development,
Dept of Zoology, University of Cambridge, Cambridge, UK

Recorded Lectures

My lecture series “Beyond Networks: The Evolution of Living Systems” presents a new processual perspective on evolution, which focuses on the nature of organisms as goal-seeking agents.

I teach a crash course in the philosophy of science for scientists, called “Science as Process and Perspective.” It consists of moderated discussions and a series of lectures, which are available online.

Another lecture series, given annually to the biology PhD students of Cambridge University, is entitled “Modelling in Developmental Biology.”

These lectures are publicly available on my YouTube channel:

<https://www.youtube.com/channel/UCStM7WbWmY1UZsg5nHdUuGA>.

Apart from the “Beyond Network” lectures (see above), there are a number of my public talks that have been recorded which can be accessed through this playlist:

https://www.youtube.com/playlist?list=PL8vh-kVsYPqO-GMo4KGGPqGEZXp4QwM_k.

- 2019 (Sep) “Dynamical Modules and Morphogenetic Fields in Development & Evolution”
Evolvability Working Group, Centre for Advanced Study, Oslo, NO
- 2019 (Feb) “What is time? What is change?”
Sciences in Context Seminar, CRI Paris, FR
- 2018 (Feb) “Beyond networks: evolutionary dynamics of developmental processes”
PhilInBioMed Seminar, Bordeaux, FR
- 2016 (Dec) “Everything flows: a processual perspective on life”
Workshop: “The Nature of our Biophilic Universe”, Rome, IT

Media Appearances/Outreach

- 2016 (Sep) **Interview**, MeinBezirk.at (<https://bit.ly/2M49lZ9>)
- 2016 (Feb) **Interview**, Ö1 Radiokolleg (Austrian National Radio): “Grundlagenforschung”
- 2015 (Nov) **Interview**, Laborjournal (https://www.laborjournal.de/epaper/LJ_15_11.pdf)
- 2016/17 **Volkshochschule Wien (VHS)**, various public lectures on basic science, systems, biology, organisms, and the question “what is life?” (in German)

Arts & Science Collaborations

- 2020– **Basak Senova, Bronwyn Lace, Marcus Neustetter**, The Zone (<http://the-zone.at>)
- 2018/19 **Sépànd Danesh**, Hubtopia, CRI Paris (<https://hubtopia.org>)
- 2015–17 **Gregory Boyle**, Movie Portraits of KLI Klosterneuburg (<https://goo.gl/2cMSt4>)
- 2016/17 **Gemma Anderson**, Isomorphogenesis, KLI (<https://goo.gl/M57Jrz>)
- 2016 **Felix Scholz**, Artist in Residence, KLI Klosterneuburg (<https://goo.gl/j6YtwL>)
- 2016 **Wim Hordijk**, Exhibition: Art & Science of Nature, KLI (<https://goo.gl/M5rsTK>)

Other Professional Activities

- 2018– **Scientific Advisory Board**, Phd Programme in Theoretical & Evolutionary Biology
Charles University, Prague, CZ
- 2019– **Recommender**, Peer Community in (PCI) Evolutionary Biology
- 2018– **Biology Editor**, Philosophy, Theory, and Practice in Biology (PTPBio)
- 2008–2015 **Academic Editor**, PLoS ONE (36 papers handled)
- 2012– **Editorial Board**, Journal of Experimental Zoology B (Mol. Dev. Evol.)
- 2012– **Editorial Board**, In Silico Biology
- 2011– **Review Editorial Board**, Frontiers in Systems Biology
- 2011– **Review Editorial Board**, Frontiers in Bioinformatics and Computational Biology
- 2006– **Reviewer** for eLife, Cell, PNAS, PLoS Biology, Nature Cell Biology, PLoS
Computational Biology, Molecular Systems Biology, Current Biology, Molecular
Biology and Evolution, Development, Developmental Biology, Developmental
Dynamics, Bioinformatics, BMC Biology, BMC Systems Biology, BMC Research
Notes, Journal of Theoretical Biology, Journal of Mathematical Biology, Bulletin of
Mathematical Biology, PLoS ONE, Journal of the Royal Society Interface, Proceedings
of the Royal Society B, History & Philosophy of the Life Sciences, Philosophy &
Theory in Biology, Acta Biotheoretica (87 papers reviewed so far)
- 2008– **Grant Reviewer** for the European Research Council (ERC), Human Frontiers
Science Program (HFSP), the Austrian Academy of Science (ÖAW), the British
Biotechnology and Biological Sciences Research Council (BBSRC), the Leverhulme
Trust (UK), the Dutch Organisation for Scientific Research (NWO), the Flemish
Fund for Scientific Research (FWO), the French Agence Nationale de la Recherche
(ANR), Inserm (France), the Israel Science Foundation (ISF), and the Spanish
Ministry of Science and Innovation (MICINN, now MINECO)
(30 grants reviewed so far)

Seminars/Lectures at Professional Meetings and Workshops (invited talks unless otherwise noted)

- 2021 Center for Molecular & Cellular Bioengineering, Dresden, DE
Evolutionary Knowledge for Everyone (Evoke), Barcelona, ES
CSIC Institute of Evolutionary Biology (IBE), Barcelona, ES
Max Planck Research School for Evolutionary Biology, DE
Réunion Référents Science Ouverte France, Paris, FR
- 2020 Departmental Seminar, Sainsbury Laboratory, Cambridge, UK
Jeudis de l'Histoire et de la Philosophie des Sciences, ENS Paris, FR
Departmental Seminar, Friedrich Miescher Institute (FMI), Basel, CH
EvoLunch Seminar, Institute for Science and Technology (IST) Austria, Vienna, AT
Fellow Seminar, Institut d'Études Avancées (IEA) Paris, FR
CEFISES Seminar, Université Catholique de Louvain-la-Neuve, BE
Public Seminar, Stellenbosch University/STIAS, Stellenbosch, ZA
- 2019 Institute Seminar, Instituto Gulbenkian de Ciência, Oeiras, PT
Webster Private University Vienna, AT
Centre for Advanced Study (CAS), Oslo, NO
Intl Soc for Hist, Phil & Soc Stud of Biology (IHSPSSB) 2019, Oslo, NO
Thinking About Science, Philosophy & Science Seminar, IST Austria, Vienna, AT
Egenis (The Centre for the Study of Life Sciences), University of Exeter, Exeter, UK
Sciences in Context, Centre de Recherches Interdisciplinaires (CRI), Paris, FR
Institut de Biologie, Paris-Seine (IBPS), Paris, FR
Evo-Devo Seminar, Cambridge University, Cambridge, UK
DSC External Seminar, The *Crick* Institute, London, UK
Institut d'Histoire et de Philosophie des Sciences et des Techniques (IHPST), Paris, FR
Masterclass, Centre de Recherches Interdisciplinaires (CRI), Paris, FR
- 2018 Centre Cavallès, École Normale Supérieure (ENS), Paris, FR
Seminar de l'Institut Jacques Monod, Paris, FR
Réseau de Biologie des Systèmes, Sorbonne Université, Paris, FR
Austrian Research Institute for Artificial Intelligence (OFAI), Vienna, AT
International Study Group for Systems Biology (ISGSB), Tromsø, NO
EvoPAD Student Seminar, University of Münster, Münster, DE
Seminar, Institute for Advanced Study, University of Amsterdam, NL
Conference: "A Process Ontology for Contemporary Biology", London, UK
Seminar, IAS-Research, University of the Basque Country, San Sebastian, ES
Philosophy & Biology Seminar, Université de Bordeaux, FR
- 2017 Seminar, Université Nice Sophia Antipolis, Nice, FR
Seminar, Institute pour la Génomique Fonctionnelle Lyon (IGFL), Lyon, FR
Seminar, Charles University, Prague, CZ
Research Seminar, The Turing Center, ETH Zurich, CH
Workshop: Organisation as a Theoretical Principle for the Life Sciences, Paris, FR
Seminar, Institut Jacques Monod, Paris, FR
Workshop: Causal Foundations of Biological Information, KLI Klosterneuburg, AT
Engineering of Chemical Complexity, Vilanova i la Geltrú, ES
Workshop: Cause and Process in Evolution, KLI Klosterneuburg, AT
Workshop: Organisms – Living Systems and Processes, Univ of Exeter, UK
Dome of Visions, Royal Institute of Technology (KTH), Stockholm, SE
Seminar, DK "Sciences in Historical, Philosophical & Cultural Context", Vienna, AT
- 2016 Seminar, Biotechnology Institute, University of Helsinki, FI
Workshop, "The Nature of our Biophilic Universe", Rome, IT
Philosophy of Science Association (PSA) Meeting, Atlanta, USA
Workshop, "Networks in Biology", Göttingen, DE
Euro Evo Devo, Uppsala, SE
Workshop "Chemolution", Dept of Theoretical Chemistry, University of Vienna, AT
Seminar, COSB, University of Vienna, AT

- 2016 Workshop “Life Sciences & Simulation”, MECS, Lüneburg, DE
Seminar, MPI-CBG, Dresden, DE
Workshop on Evolutionary Systems Biology, Hinxton, UK
Vienna BioCenter Recess, Schloss Hernstein, Vienna, AT
Natural History Museum, London, UK
- 2015 Complexity Colloquium, Nové Hradý, University of Southern Bohemia, CZ
EvoLunch Seminar, IST Austria, Klosterneuburg, AT
Workshop “Theory in EvoDevo”, Pan-American Evo-Devo Meeting, Berkeley, USA
Institute of Genetics, University of Cologne, Cologne, DE
MSB Seminar, Institute for Theoretical Biology, Humboldt University, Berlin, DE
KLI Colloquium, Konrad Lorenz Institute, Vienna, AT
- 2014 Berlin Institute for Medical Systems Biology (BIMSB), Berlin, DE
Workshop “Novelty in Biological, Social & Technological Systems”, Santa Fe, USA
Junior European Drosophila Investigators (JEDI) Meeting, Carry-le-Rouet, FR
Workshop on “Explaining Development”, Istituto Veneto, Venice, IT
Euro Evo Devo, Vienna, AT
7th Intl Symposium on Molecular Insect Science, Amsterdam, NL
Symposium on “Molecular Mechanisms in Development and Evolution”, Basel, CH
Dept for Craniofacial Development, Kings College, London, UK
- 2013 NESCent Evo-Devo Workshop, Durham, USA
CRG/CIFAR Genetic Networks Meeting, Barcelona, ES
European Conference on Complex Systems (ECCS), Barcelona, ES
Konrad Lorenz Institute Workshop on Evolutionary Systems Biology, Vienna, AT
Society for Experimental Biology (SEB), Annual Meeting, Valencia, ES
UB-CRG Biophysics Workshop, Barcelona, ES
CRG-RIKEN Joint Meeting, Barcelona, ES
Developmental Biology Colloquium, Univ of Göttingen, DE
National Institute for Medical Research, Mill Hill, London, UK
- 2012 School of Mathematics and Statistics, Univ of Sheffield, UK
1st Spanish Drosophila Research Conference, Aiguablava, Begur, ES
Perspectives in Translational Medicine, CRG, Barcelona, ES
Contributed Talk, EVONET Symposium Vienna, AT
Euro Evo Devo, Lisbon, PT
Evo-Devo Seminar, Dept of Zoology, Univ of Cambridge, UK
Talk, ESF Conference “Systems Biology of *Drosophila* Development”, Pultusk, PL
Institute for Theoretical Biology, Humboldt Univ, Berlin, DE
Contributed Platform Talk, Drosophila Research Conference, Chicago, USA
- 2011 Systems Biology Department, Univ of Exeter, UK
Instituto Gulbenkian de Ciência, Lisbon, Portugal
Barcelona Developmental Biology Retreat, Sant Feliu de Guíxols, Spain
Contributed Talk, European Society for Evolutionary Biology, Tübingen, DE
European Conference for Mathematical & Theoretical Biology, Krakow, Poland
British Societies for Cell & Dev Biology, Joint Spring Meeting, Canterbury, UK
Workshop on “Reflexive Systems Biology”, Bergen, NO
Centro Andaluz de Biología del Desarrollo (CABD), Sevilla, ES
Invited Workshop Talk, Drosophila Research Conference, San Diego, USA
- 2010 Meeting of the Spanish Systems Biology Network, Barcelona, ES
EMBO Conference “From Functional Genomics to Systems Biol.”, Heidelberg, DE
EMBO Workshop “Systems Biology of Development”, Ascona, CH
Institute for Developmental Biology & Cancer, Nice, FR
Intl Symposium on Networks in Biology (ISNB), Amsterdam, NL
Invited Student Seminar, Institute for Population Genetics, Vienna, AU
British Council Workshop, Systems Approaches to Dev. Biology, Ronda, ES
Institute for Research in Biomedicine (IRB), Barcelona, ES
- 2009 École Normale Supérieure, Paris, FR

- 2009 CWI Minisymposium, Univ of Amsterdam, NL
 Biochemistry and Genetics Seminars, Stony Brook Univ, USA
 Darwin Seminar Series, Univ of Chicago, USA
 Circle de Conferències sobre Biologia de Sistemes, Univ of Vic, ES
 Symposium on Evolution, Genes and Networks, Utrecht, NL
- 2008 Physics of Living Matter III, Cambridge, UK
 Euro Evo Devo, Ghent, BE
 European Conference for Mathematical & Theoretical Biology, Edinburgh, UK
 Intl Symposium on Networks in Biology (ISNB), Amsterdam, NL
 Cambridge Fly Seminar Series, Cambridge, UK
 Workshop on Gene Regulation and Noise, Univ of Sao Paulo, Sao Carlos, BR
 Physics of Living Matter II, Cambridge, UK
 Cell & Developmental Biology Seminar, Biozentrum, Basel, CH
 Contributed Talk, Biology without Borders, Microsoft Research, Trento, IT
 British Society for Developmental Biology, Autumn Meeting, Sheffield, UK
 Population and Evolutionary Approaches to Biological Systems, Cambridge, UK
- 2007 Marie Curie Zoonet Meeting, Heraklion, GR
 Contributed Talk, Swiss Society for Experimental Biology (USGEB), Basle, CH
 Intl Symposium on Networks in Biology (NBIC-ISNB), Amsterdam, NL
 Developmental and Neurobiology Seminar Series, NIMR, Mill Hill, London, UK
- 2006 Cambridge Fly Seminar Series, Cambridge, UK
- 2004 Seminar Series in Quantitative Biology, McGill Univ, Montreal, CA
 Dynamics, Control and Computation in Biochemical Networks, Banff, CA
 Contributed Talk, Drosophila Research Conference, Washington DC, USA
- 2003 Theoretical Division/Complex Systems Group, Los Alamos NM, USA
- 2002 City Seminar in Bioinformatics, St. Petersburg, RU
- 2002 Modelling for Integration with Proteins, Networks & Signals, Sheffield, UK
- 2001 Isaac Newton Institute for Mathematical Sciences, Cambridge, UK

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