

CV

Name: Carl-Philipp Heisenberg

Current position: Professor

Date and place of birth: 03.07.1968, Munich/Germany

Address: IST Austria, Am Campus 1, 3400 Klosterneuburg

Contact:

Phone: +43 2243 9000 3901

Fax: +43 2243 9000 2000

Email: heisenberg@ist.ac.at

Administrative Support: Alexandra Mally (+43 2243 9000 1105, alexandra.mally@ist.ac.at)

Website: <https://heisenberglab.pages.ist.ac.at/>

ORCID: 0000-0002-0912-4566

Google Scholar: <https://scholar.google.com/citations?user=WZ1TUscAAAAJ&hl=en>

Employment

- 2010 –** Full Professor at the **Institute of Science and Technology Austria, Austria**
- 2001 – 2010** Group Leader at the **Max-Planck-Institute of Molecular Cell Biology and Genetics, Germany**
- 1997 – 2001** Postdoctoral fellow at the **Department of Anatomy and Developmental Biology, University College London, UK**

Education

- 1997** PhD thesis in the lab of Christiane Nüsslein-Volhard at the **Max-Planck-Institute for Developmental Biology, Germany**
- 1993** Master thesis in the lab of Michael Sofroniew at the **Department of Anatomy, University of Cambridge, UK**
- 1992** Diploma thesis in the lab of Hans Thoenen at the **Max-Planck-Institute for Psychiatry, Germany**

Main areas of research: Developmental Biology. Cell Biology, Biophysics

Research Statement:

We are studying various forms of cell interactions underlying the development of multicellular structures, such as tissues, organs and embryos, using zebrafish and ascidian embryos as model organisms. We are specifically interested in the role of cell adhesion, polarization, movement and division in the processes by which the embryo takes shape. For studying their contribution, we are using a combination of molecular, cellular and biophysical approaches. This allows us to unravel how mechanical forces are being generated, transduced, received and sensed within the developing embryo, which ultimately determines how the embryo takes its shape. We have chosen zebrafish and ascidian embryos as model organisms to study tissue, organ and embryo morphogenesis, as they are chordates, similar to humans, but also develop outside of their mother and are thus easily accessible for experimental manipulations. In addition, ascidian embryos display an invariant cell lineage, allowing us to directly investigate the relationship between cell/tissue morphogenesis and cell fate specification. We have also begun using gastruloids/organoids consisting of zebrafish stem cells, but still consider the actual embryo as the 'gold standard' for understanding tissue/organ morphogenesis in a physiologically relevant context. Currently, the main focus of the lab is on mechanosensation and morphogenetic processes mediated by phase transitions, such as tissue fluidization.

Additional Achievements (10 selected)

2019	Carus Medal, German Academy of Sciences Leopoldina
2017	ERC Advanced Grant
2017	Lower Austrian Science Award
2016	Member of EMBO
2015	Member of the German National Academy of Sciences Leopoldina
2001 – 2005	Emmy Noether Junior Professorship
1998 – 2001	Marie Curie Postdoctoral Fellowship
1997 – 1998	EMBO Postdoctoral Fellowship
1992 – 1993	DAAD Exchange Fellowship

Member

2022 -	Chair (elected) Professorial Committee IST Austria
2019 -	Deputy Representative of IST Austria at FWF Delegates Assembly
2019 -	Deputy Editor - Cells and Development
2018 -	Member of the Board of Reviewing Editors at SCIENCE
2018 -	Editorial Board - Developmental Cell
2016 -	Member (elected) of the DFG Senate committee for Collaborative Research Centers
2015 -	Member of the Scientific Advisory Board, Ingrid zu Solms Stiftung Frankfurt
2012 -	Editorial Board - Development,
2012 -	Editorial Board - Current Biology
2011 -	Editorial Board - EMBO Journal,
2011 -	Editorial Board - Developmental Biology
2011 -	Scientific Evaluation - IBDML Marseille, France
2011 -	Scientific Evaluation - Universität Innsbruck, Austria
2011 – 2014	Austrian Representative - ESF Research Network "QuanTissue"
2010 – 2020	Editorial Board - Current Opinion in Cell Biology
2009 -	Faculty 1000 (Head of Section)
2008 – 2014	Editor - PLoSOne
2007 – 2011	Study Section Member (elected) - DFG evaluation panel for Developmental Biology, Cell Biology, Anatomy and Genetics

Ten most important publications

1. *Petridou NI, Corominas-Murtra B, **Heisenberg CP***, Hannezo E (*co-corresponding and lead author)
Rigidity percolation uncovers the structural basis of embryonic tissue phase transitions.
Cell. 2021 Apr 1;184(7):1914-1928.e19. doi: 10.1016/j.cell.2021.02.017.
2. *Schwayer C, Shamipour S, Pranjic-Ferscha K, Schauer A, Balda M, Tada M, Matter K, **Heisenberg CP**.
Mechanosensation of tight junctions by ZO-1 phase separation and flow.
Cell. 2019 Oct 31;179(4):937-952. DOI: 10.1016/j.cell.2019.10.006
3. Shamipour S, Kardos R, Xue SL, Hof B, Hannezo E, **Heisenberg CP**.
Bulk Actin Dynamics Drives Phase Segregation in Zebrafish Oocytes.
Cell. 2019 May 30;177(6):1463-1479. DOI: 10.1016/j.cell.2019.04.030
4. Xia P, Gütl D, Zheden V, **Heisenberg CP**.
Lateral Inhibition in Cell Specification Mediated by Mechanical Signals Modulating TAZ Activity.
Cell. 2019 Mar 7;176(6):1379-1392. DOI: 10.1016/j.cell.2019.01.019
5. *Petridou NI, Grigolon S, Salbreux G, Hannezo E, **Heisenberg CP**.
Fluidization-mediated tissue spreading by mitotic cell rounding and non-canonical Wnt signalling.
Nat Cell Biol. 2019 Feb;21(2):169-178. DOI: 10.1038/s41556-018-0247-4
6. Smutny M, Ákos Z, Grigolon S, Shamipour S, Ruprecht V, Čapek D, Behrndt M, Papusheva E, Tada M, Hof B, Vicsek T, Salbreux G, **Heisenberg CP**.
Friction forces position the neural anlage.
Nat Cell Biol. 2017 Apr;19(4):306-317. DOI: 10.1038/ncb3492
7. Ruprecht V, Wieser S, Callan-Jones A, Smutny M, Morita H, Sako K, Barone V, RitschMarte M, Sixt M, Voituriez R, **Heisenberg CP**.
Cortical contractility triggers a stochastic switch to fast amoeboid cell motility.
Cell. 2015 Feb 12;160(4):673-85. DOI: 10.1016/j.cell.2015.01.008
8. Behrndt M, Salbreux G, Campinho P, Hauschild R, Oswald F, Roensch J, Grill SW, **Heisenberg CP**.
Forces driving epithelial spreading in zebrafish gastrulation.
Science. 2012 Oct 12;338(6104):257-60. DOI: 10.1126/science.1224143
9. Maître JL, Berthoumieux H, Krens SF, Salbreux G, Jülicher F, Paluch E, **Heisenberg CP**. Adhesion functions in cell sorting by Mechanically Coupling the Cortices of Adhering Cells.
Science. 2012 Oct 12;338(6104):253-6. DOI: 10.1126/science.1225399
10. Krieg M, Arboleda Y, Puech PH, Käfer J, Graner F, Muller DJ and **Heisenberg CP**.
Tensile forces govern germ layer organization during gastrulation.
Nat Cell Biol. 2008 Apr;10(4):429-36. DOI: 10.1038/ncb1705