CURRICULUM VITAE

(February 8, 2025)

PERSONAL INFORMATION

Name: **Christian Hilbe**
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RESEARCH INTERESTS

Classical and evolutionary game theory and its applications in biology and the social sciences, using the tools of stochastic processes, dynamical systems and experimental economics

TEACHING INTERESTS

Quantitative Methods: Calculus, linear algebra, ordinary differential equations and dynamical. systems, stochastic processes, probability theory and statistics.
Applications: Computational social science, (evolutionary and/or classical) game theory, decision theory, behavioral economics, biomathematics

CURRENT POSITION

IT:U Interdisciplinary Transformation University (Since 01/2025)
Professor of Game Theory and Evolutionary Dynamics

PREVIOUS POSITIONS

Max Planck Institute (MPI) for Evolutionary Biology, Germany 2019 – 2024
Group leader, Max Planck Research Group Dynamics of Social Behavior

Institute of Science and Technology Austria (ISTA) 2015 – 2019
Research scientist in the Chatterjee group (Krishnendu Chatterjee)

Harvard University, USA 2013 – 2015
Research scientist at the Program for Evolutionary Dynamics (Martin Nowak)

Max Planck Institute for Evolutionary Biology, Germany 2011 – 2013
Research scientist at the Evolutionary Theory Group (Arne Traulsen)

University of Vienna, Austria 2008 – 2011
Research scientist at the Faculty of Mathematics (Karl Sigmund)

RESEARCH STAYS

Harvard University (several visits) 2016 – 2019

Max Planck Institute for Evolutionary Biology (several visits) 2014 – 2015

Center of Rationality, Hebrew University, Israel 2010 – 2011

International Institute for Applied Systems Analysis (IIASA), Austria. 2009
Participant of the Young Scientists Summer Program

HIGHER EDUCATION

PhD in Mathematics, University of Vienna 03/2012
Thesis: "Public good games with incentives", Advisor: Karl Sigmund
Graduated 'sub auspiciis Praesidentis rei publicae', the highest honor in Austria

MSc in Mathematics, University of Vienna 09/2008

Grants and Fellowships

ERC Starting Grant, European Research Council (**EUR 1,439,000**) — 2019
Panel LS8 – Evolutionary, Population and Environmental Biology
Project: *"Evolution of direct reciprocity in complex environments"*

IST Fellowship, funded by the People Programme (Marie Curie Actions) of the EU's Seventh Framework Program (**EUR 159,759**) — 2015
Project: *"Partner and rival strategies in repeated games"*

Erwin Schrödinger Fellowship, Austrian Science Fund (**EUR 80,118**) — 2013
Project: *"The evolution of extortion in repeated games"*

Travel grants, awards

International exchanges grant of the Royal Society (UK), for a collaboration with Prof. Hong Duong of the University of Birmingham (£ 11,960 in total). — 2022

Award of excellence ("Würdigungspreis") of the Ministry of Science and Research, awarded to Austria's top 50 students (EUR 2,500 each) — 2009, 2012

Excellence scholarship of the University of Vienna (EUR 4,500) — 2012

Appreciation Award of the State Vorarlberg in recognition of my graduation 'sub auspiciis Praesidentis rei publicae' (EUR 2,000) — 2012

Mikhalevich Award of the International Institute for Applied Systems Analysis — 2010

Professional activities, community service

- **Group leader representative** and **Member of the Graduate Student Committee** at the Max Planck Institute for Evolutionary Biology (2021–2024).
- **External reviewer** for the PhD thesis of Cong Li (Mathematics, University of Montreal, 2020) and of Peter S. Park (Mathematics, Harvard University 2023).
- Member of the **thesis advisory committee** for Christin Nyhoegen, MPI for Evolutionary Biology (2020-2023), and Maria Alejandra Ramirez, MPI for Evolutionary Biology (2022-2025).
- **Grant referee** for the National Science Foundation (USA); German Research Foundation (GER); Hungarian National Research, Development, and Innovation Office (HUN); Hong Kong Research Grants Council (HK); Cultural Evolution Society Transformation Fund; Leverhulme Trust (UK); Marsden Fund (NZ);
- **Associate editor** for PLoS Computational Biology (since 11/2021) and the Proceedings of the Royal Society B (since 04/2024).
- **Guest editor** for the Proceedings of the National Academy of Sciences, and for PLoS Computational Biology;
- **Editor for a special issue** in GAMES on *Cooperation, Trust, and Reciprocity* (2015); and in Dynamic Games and Applications on the *50th anniversary of evolutionary game theory* (2023).
- **Journal referee** for various Nature journals (Nature, Nat. Human Behaviour, Nat. Climate Change, Nat. Sustainability, Nat. Communications), Science Advances, PNAS, Proceedings of the Royal Society B, Philosophical Transactions of the Royal Society B, PLoS Computational Biology, Journal of Theoretical Biology, Journal of Mathematical Biology, Bulletin of Mathematical Biology, Trends in Ecology and Evolution, among others.

Conferences, Workshops

- Mathematical Models in Ecology and Evolution (Vienna 2024)
  Talk: *Efficiency and resilience of cooperation in asymmetric social dilemmas*
- Social Dilemmas (Leiden 2024)
  Talk: *Efficiency and resilience of cooperation in asymmetric social dilemmas*
- Learning, Evolution, and Games (Amsterdam 2023)
  Talk: *Evolutionary instability of selfish learning*
- Workshop: The Future of Mathematical Social Science (Pennsylvania 2023, virtual)
  Talk: *Evolutionary game theory — the status quo and the gaps*
- Social Dilemmas (Copenhagen 2022)
  Talk: *A unified framework of direct and indirect reciprocity*
- Mathematical Models in Ecology and Evolution (Reading 2022)
  Talk: *A unified framework of direct and indirect reciprocity*
- Workshop: Future of Games in Biology (Plön 2022)
  Talk: *Evolution of cooperation – what has happened, where are the gaps?*
- European Human Behavior and Evolution Association (Leipzig 2022, virtual)
  Poster: *A unified framework of direct and indirect reciprocity*
- Oskar Morgenstern Platz Meeting (Vienna 2021)
  Talk: *Robust cooperation in alternating games*
- Workshop on Evolutionary Game Theory (Vienna 2019)
  Talk: *Social dilemmas among unequals*
- Ernst Strüngmann Forum (Frankfurt 2019)
  Discussion paper: *The evolution of strategic ignorance in strategic interaction*
- GAMENET (Cracow 2018)
  Talk: *Extortion and cooperation in repeated games*
- Mathematical models in Ecology and Evolution (London 2017)
  Talk: *The signal-burying game: Why we hide positive traits and good deeds*
- European Conference for Mathematical and Theoretical Biology (Nottingham 2016)
  Talk: *Extortion and generosity in repeated games*
- Symposium in honor of Karl Sigmund's 70th birthday (Vienna, 2015)
  Talk: *Extortion and generosity in repeated games*
- Workshop: Current topic workshop: Evolutionary game theory (Columbus, 2015)
  Poster: *Extortion and generosity in repeated social dilemmas*
- Evolution 2012 (Ottawa 2012).
  Talk: *Emergence of responsible sanctions*
- European Conference on Complex Systems (Vienna 2011)
  Talks: *Evolution of cooperation and punishment in non-anonymous societies*, and *Equilibrium selection with representation effects*
- Second Baltic Autumn School: Workshop on Systems Biology (Lübeck 2011)
  Talk: *Evolutionary game theory*
- Workshop on Evolutionary approaches to international cooperation (Tilburg, 2011)
  Talk: *Public good games under time pressure*
- TECT Conference (The evolution of cooperation and trading, Budapest 2010)
  Talk: *Incentives and opportunism: From the carrot to the stick*

INVITED LECTURES

- University of Zürich (Oct 2024)
  Talk: *Direct reciprocity in complex environments*
- Center for Humans & Machines, MPI for Human Development (Jan 2024)
  Talk: *The evolutionary game theory of cooperation, social norms, and modesty*
- Peking University (Nov 2023, virtual)
  Talk: *Modeling direct and indirect reciprocity*
- Dalian University (March 2023, virtual)
  Talk: *Evolution of cooperation in asymmetric social dilemmas*
- Cooperation colloquium (Feb 2023, virtual)
  Talk: *A brief history of modeling direct and indirect reciprocity*
- Technical University Graz (Feb 2023)
  Talk: *Exploring human cooperation with models and data*
- University of Vienna (March 2022, virtual)
  Talk: *Cooperation in alternating interactions with memory constraints*
- Technical University Munich (Feb 2022, virtual)
  Talk: *Memory-n strategies of direct reciprocity*
- Beijing Institute of Technology (Dec 2021, virtual)
  Talk: *The mathematics of direct reciprocity*
- Institute of Mathematics, University of Lübeck (Nov 2021)
  Talk: *The dynamics of direct reciprocity under memory constraints*
- cege Research Colloquium, University of Göttingen (June 2021, virtual)
  Talk: *The evolution of direct and indirect reciprocity*
- Institute for Advanced Study in Toulouse General Seminar (June 2021, virtual)
  Talk: *The evolution of indirect reciprocity under noisy and incomplete information*
- Max Planck Research Group Leader Meeting (May 2020, virtual)
  Talk: *Evolution of reciprocal cooperation.*
- University of Vienna, Vienna (Jan 2020).
  Talk: *The dynamics of direct and indirect reciprocity.*
- University of Exeter, Exeter UK (Nov 2019).
  Talk: *Social dilemmas among unequals.*
- University of Vienna, Vienna (Oct 2019).
  Talk: *Social dilemmas among unequals.*
- University of British Columbia, Vancouver (Jan 2019).
  Talks: *The evolution of indirect reciprocity under noisy and private information*, and *Modeling the dynamics of extortion and cooperation in repeated games.*
- Research Platform Cognitive Science, Vienna (Oct 2018).
  Talk: *Direct reciprocity under cognitive constraints.*
- Department of Economics, Middlesex University, London (Jan 2018)
  Talk: *Extortion and cooperation in repeated games.*
- Max Planck Institute for Mathematics in the Sciences, Leipzig (Apr 2017)
  Talk: *Extortion and cooperation in repeated games.*
- Max Planck Institute for Research on Collective Goods, Bonn (Oct 2016)
  Talk: *Extortion and generosity in repeated games.*
- Colloquium for Complex Systems and Modeling, University of Oldenburg (Jan 2013)
  Talk: *Reputation, opportunism, and the evolution of punishment.*

PhD student supervision

Adile Yasar (MPI for Evolutionary Biology, IT:U). Since 2024
Topic: *Experimental approaches to human cooperation*.

Abir Utthasani (MPI for Evolutionary Biology, IT:U). Since 2024
Topic: *Cooperation in stochastic games*.

Marta Couto (MPI for Evolutionary Biology, University of Lübeck). 2020–2024
PhD thesis: *Mathematical models of cooperation among heterogeneous individuals*.
Two joint papers published (New J. Physics, 2022; Phil. Trans. Royal Soc. B, 2023), one more in preparation. Currently a Post-Doc at the **University of Amsterdam**.

Charlotte Rossetti (MPI for Evolutionary Biology, University of Kiel). 2020–2024
PhD thesis: *Mechanisms and Benefits of Reciprocal Relationships*.
Three joint papers published (Curr. Op. Psych., 2022; Nature Comput. Sci., 2022; Ethology 2023), one more submitted. Currently a Post-Doc at **University of Zürich**.

Saptarshi Pal (MPI for Evolutionary Biology, University of Kiel). 2020–2024
PhD thesis: *The role of information on the evolution of cooperation*.
First joint paper published (Nature Comms., 2022), three more in preparation. Currently a Post-Doc at **Harvard University**.

Peter Park (Harvard University). 2020–2023
Co-supervision of PhD thesis on *Game theory and the evolution of human cognition*.
First joint paper published (Nature Comms., 2022). Currently a Post-Doc at **MIT**.

Laura Schmid (Institute of Science and Technology Austria). 2016–2021
Co-supervision of PhD thesis *Evolution of cooperation via (in)direct reciprocity under imperfect information*.
Five joint articles published (e.g., PNAS, 2018; Nat. Hum. Behav., 2021; Nat. Comms., 2023). Currently an editor at **Nature Communications**.

Undergraduate supervision

Franziska Lesigang (TU Wien, Austria). Internship on direct reciprocity with bounded memory (Main supervisor: Nikoleta Glynatsi) 2021

Logan Cartau (University of Rennes, France). Internship on direct reciprocity in co-evolving populations (Main supervisor: Nikoleta Glynatsi) 2021

Farbod Ekbatani (Sharif University of Technology, Tehran). Internship on evolution of norms; resulted in a publication (Nat. Comms. 2023). 2019

Rachel Gologorsky (Harvard University). Bachelor's thesis on endogenous game choice, won the Harvard College Thomas T. Hoopes Prize. 2018–2019

Pouya Shati (Sharif University of Technology, Tehran). Internship; resulted in a publication (Sci. Rep. 2021). 2018

Štěpán Šimsa (Charles University Prague). Bachelor's thesis; resulted in two publications (Nature 2018, Nat. Comms. 2023) 2016

Kate Donahue (Harvard University). Bachelor's thesis, won the Harvard College Thomas T. Hoopes Prize, and the Herb Alexander award. Published as article (Nature Comms., 2020). 2015

Sarah Schoenmakers (University of Oldenburg). Master thesis, also published as an article (J. Theor. Biol., 2014). 2013

Teaching Experience

Course: **Dynamics of Social Behavior** (2022).
Audience: Participants of the Helsinki Summer School On Mathematical Ecology and Evolution
Content: Basic concepts of classical and evolutionary game theory, and how these concepts can be applied to make sense of human cooperation and social norms.

Course: **Mathematical Biology in Action during the Corona Pandemic** (2021-2022).
Audience: Jointly with members of the Evolutionary Theory Department of the MPI, held at the Mathematics Department of the University of Lübeck, Germany.
Content: I taught a class on statistical methods relevant to epidemiology and to measuring the efficacy of vaccines, and a general summary class.

Course: **Classical Game Theory** (2021).
Audience: Students of the International Max Planck Research School for Evolutionary Biology, at the MPI for Evolutionary Biology
Content: Basic concepts of classical game theory (static and dynamic games, with complete or incomplete information), and its applications in the social sciences.

Course: **Math 153 and Math 243 on Evolutionary Dynamics** (2014–2019).
Audience: Various guest lectures at Harvard University
Content: Discussing models and experimental evidence for cooperation in repeated games.

Course: **Evolutionary game theory – from basics to recent developments** (2012–2013).
Audience: Jointly with Arne Traulsen and Philipp Altrock, held at the Mathematics Department of the University of Lübeck.
Content: I taught classes on classical game theory, and on the analysis of reciprocal interactions.

Public Outreach

I like to engage with the (general and scientific) public to illustrate the applications of mathematics in other sciences and in daily life. As part of these activities, I have done the following.

- Counselor for a youtube video on the repeated prisoner's dilemma by the content provider 'Veritasium' (2023)
- Public Lecture "Mathematics of cooperation", MPI for Evolutionary Biology (2020)
- IST Alumni talk, addressing career options for Post-Docs and Grant Writing (2020)
- Course on game theory for the Lower Austrian Talent's Academy (2018)
- Participation at the Long Night of Research, and IST Open Campus (2016-2017)
- My work has been featured in various news outlets and blogs, including Der Standard, Frankfurter Allgemeine Zeitung, Scientific American, Wired, Guardian Liberty Voice, Quanta Magazine, Harvard Gazette, and Nature News

Major Collaborators

Krishnendu Chatterjee, Institute of Science and Technology Austria.
Nikoleta Glynatsi, RIKEN Advanced Institute for Computational Science, Japan.
Oliver Hauser, Department of Economics, University of Exeter Business School, Exeter, UK.
Maria Kleshnina, Mathematics Department, Queensland University of Technology, Australia.
Alex McAvoy, Mathematics Department, University of North Carolina at Chapel Hill, USA.
Yohsuke Murase, RIKEN Advanced Institute for Computational Science, Japan.
Martin A. Nowak, Departments of Mathematics and of Biology, Harvard University, USA.
Karl Sigmund, Faculty of Mathematics, University of Vienna, Austria.
Arne Traulsen, Max Planck Institute for Evolutionary Biology, Plön, Germany.