

# Florian Klimm

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📄 <https://floklimm.github.io/>

## Education

- 2014–2018 **DPhil (PhD)**, *University of Oxford*, Kellogg College.  
*Systems Approaches to Biomedical Sciences* Centre for Doctoral Training  
Mathematical Institute
- 2012–2014 **Master of Science (Physics)**, *Humboldt-Universität zu Berlin*.  
Specialisation: Statistical Physics and Nonlinear Dynamics
- 2011–2012 **Fulbright Scholar**, *University of California, Santa Barbara*.  
Participation in the Education Abroad Programm of the UCSB
- 2008–2012 **Bachelor of Science (Physics with minor in Mathematics)**, *Humboldt-Universität zu Berlin*.
- 2001–2008 **Abitur (high school diploma)**, *Humboldt-Gymnasium*, Eichwalde.  
Advanced courses: Mathematics, Physics  
Class Valedictorian

## Scholarly work

(\* indicates equal contribution by multiple authors)

### Working Papers

- [1] **FK**, Charlotte M Deane, and Gesine Reinert. Hypergraphs for predicting essential genes using multiprotein complex data.
- [2] Sarah M Griffin and **FK**. Networks and Museum Collections.
- [3] **FK**, Enrique M Toledo, Thomas Monfeuga, Fang Zhang, Charlotte M Deane, and Gesine Reinert. Functional module detection through integration of single-cell RNA sequencing data with protein-protein interaction networks.  
<https://doi.org/10.1101/698647>
- [4] **FK\*** and Benjamin F Maier\*. A Network Science Summer Course for High School Students. <https://github.com/floklimm/network-summer-school>

### Publications

- [5] **FK**. Minimal connections and what they reveal. *Mathematics Today (accepted)*, 2019.
- [6] Megan M Sperry, Qawi K Telesford, **FK**, and Danielle S Bassett. Rentian scaling for the measurement of optimal embedding of complex networks into physical space. *Journal of Complex Networks*, 5(2):199–218, 2016.
- [7] Lia Papadopoulos, Pablo Blinder, Henrik Ronellenfitch, **FK**, Eleni Katifori, David Kleinfeld, and Danielle S. Bassett. Comparing two classes of biological distribution systems using network analysis. *PLOS Computational Biology*, 14(9):1–31, 09 2018.
- [8] Dane Taylor, **FK**, Heather A Harrington, Miroslav Kramár, Konstantin Mischaikow,

Mason A Porter, and Peter J Mucha. Topological data analysis of contagion maps for examining spreading processes on networks. *Nature Communications*, 6, 2015.

- [9] **FK**, Javier Borge-Holthoefer, Niels Wessel, Jürgen Kurths, and Gorka Zamora-López. Individual node's contribution to the mesoscale of complex networks. *New Journal of Physics*, 16(12):125006, 2014.
- [10] **FK**, Danielle S Bassett, Jean M Carlson, and Peter J Mucha. Resolving structural variability in network models and the brain. *PLoS Computational Biology*, 10(3):e1003491, 03 2014.

#### Peer-reviewed Conference Abstracts

- [11] **FK**, Charlotte M Deane, Jonny Wray, and Mason A Porter. Reconfiguration of protein interaction networks during nematode development *The International Conference on Complex Networks and Their Applications 2017*

#### Doctoral Thesis

title Generalised networks for protein interaction analysis  
supervisors Prof. Mason Porter, Prof. Charlotte Deane, and Dr. Jonny Wray  
examiners Prof. Gesine Reinert and Dr. Mariano Beguerisse Díaz (transfer of status), Prof. Jotun Hein and Prof. Felix Reed-Tsochas (confirmation of status), Prof. Heather Harrington and Prof. James Wakefield (DPhil)

#### Master Thesis

title Characterisation of individual nodes in the mesoscale of complex networks  
supervisors Prof. Jürgen Kurths and Dr. Gorka Zamora-López

#### Bachelor Thesis

title Charge transmission through single molecules – A density matrix approach  
supervisors Prof. Beate Röder and Dr. Volkhard May

#### Study Group Papers

(authors in alphabetical order)

- 2016 **Root Segmentation Over Multiple Time Points**, *Multi-scale Biology Study Group University of Birmingham*, Henry Allen, Laura Cooper, Gustav Delius, Meurig Gallagher, Tom Johnson, **FK**, Ferdinando Randisi, Tom Shearer, and Clare Ziegler.
- 2015 **Abstract Modelling of Adverse Outcome Pathways**, *Quantitative Systems Pharmacology Study Group AstraZeneca*, Gerold Baier, Teresa Collins, Joanne Dunster, Ciarán Fisher, Enuo He, Andrzej Kierzek, John King, **FK**, Gary Mirams, Tom Snowden, and John Ward.

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#### Honours

- 2019 **Best Poster Award**, *University of Cambridge*, Cambridge Network Day.
- 2018 **EPSRC Doctoral Prize**, *University of Oxford*.
- 2018 **Award for 'Contribution to the Life of the Department'**, *Mathematical Institute, University of Oxford*.
- 2018 **Public Engagement Prize**, *Doctoral Training Centre, University of Oxford*.
- 2017 **Best Talk Award**, *London Mathematical Society*, Graduate Student Meeting.
- 2017 **MCR Excellence Award**, *Kellogg College University of Oxford*.

- 2017 **Runner-Up 'Best Talk Award'**, *SIAM Student Chapter Conference Reading*.  
 2011 **Silver Medal**, *University Physics Competition*.  
 2008 **Humboldt-Prize**, *Humboldt-Gymnasium*, for 'outstanding GPA and his exceptional dedication to the high school'.

## Research Experience

- 10/2019–present **Research Associate**, *Imperial College*, Department of Mathematics, Dr. Nick Jones & Prof. Patrick Chinnery (Cambridge Mitochondrial Biology Unit).  
 Single cell stochastics and statistics to study ageing
- 10/2018–9/2019 **Postdoctoral Researcher**, *University Oxford*, Department of Statistics, Prof. Charlotte Deane & Prof. Gesine Reinert.  
 Liver-specific protein interaction networks
- 10/2018–9/2019 **Research Member of the Common Room**, *University Oxford*, Kellogg College.
- 6/2015–10/2018 **Doctoral Student**, *University Oxford*, Mathematical Institute, Prof. Mason Porter, Prof. Charlotte Deane, Dr. Jonny Wray & Prof. Philip Maini.  
 Network generalisations for protein interaction analysis  
 Research project in cooperation with pharmaceutical company *e-Therapeutics*
- 4/2015–5/2015 **Short Project**, *Roche Basel*, Prof. Chris Yau, Dr. Peter Humburg & Dr. Satu Nahkuri.  
 High performance computing for eQTL analysis
- 11/2013–8/2014 **Academic Visitor**, *Potsdam Institute for Climate Impact Research*, Prof. Jürgen Kurths.  
 Climate network analysis – Extreme precipitation during the Indian Summer Monsoon
- 8/2013–10/2013 **Academic Visitor**, *University of Oxford*, Mathematical Institute, Dr. Mason Porter.  
 Filtrations, Persistence homology, and contagion dynamics on networks
- 10/2012–7/2013 **Research Assistant**, *Technical University Berlin*, Department of Software Engineering and Theoretical Computer Science, Dr. Timm Lochmann.  
 Analyzation and modeling of single neuron train spikes in mice olfactory neurons
- 6/2012–9/2012 **Research Assistant**, *University of North Carolina at Chapel Hill*, Department of Mathematics, Prof. Peter J. Mucha.  
 Network analysis of neurological networks received from diffusion spectrum imaging
- 1/2012–6/2012 **Research Internship**, *University of California, Santa Barbara*, Departments of Physics & Psychological and Brain Sciences, Dr. Danielle Bassett.  
 Comparison of neurological data properties with various models  
 Numerical calculation of topological fractal dimension and Rentian scaling
- 8/2010–9/2010 **Research Internship**, *Humboldt-Universität zu Berlin*, Department of Physics, Dr. Volkhard May.  
 Understanding the principles of charge transmission through single molecules  
 Analytical and numerical calculations of master equations

## Teaching Experience

Christ Church, University of Oxford

- Trinity 2019 **Stipendiary Lecturer (Tutor)**.  
 Dynamics (Prelims), Calculus of Variation (Part A), Fourier Series and PDE's (Prelims), Multivariable Calculus (Part A)

- Michaelmas 2018 **Stipendiary Lecturer (Tutor).**  
Quantum Theory (Part A), Differential Equations I (Part A), and Probability (Part A)  
**Somerville College, University of Oxford**
- Hilary 2017 **Tutor for Undergraduates.**  
Integral Transforms (Part A)
- Michaelmas 2016 **Tutor for Undergraduates.**  
Quantum Theory (Part A)  
**Mathematical Institute, University of Oxford**
- Hilary 2019 **Tutor & Assessor.**  
Networks (Part C)
- Hilary 2018 **Tutor.**  
Networks (Part C)
- Hilary 2017 **Teaching Assistant.**  
Networks (Part C)
- Michaelmas 2016 **Teaching Assistant.**  
Graph Theory (Part B)
- Michaelmas 2015 **Teaching Assistant.**  
Numerical Solutions to Differential Equations II (Part B)  
**Doctoral Training Centre, University of Oxford**
- Michaelmas 2018 **Senior Demonstrator & Lecturer.**  
Introduction to Programming
- Michaelmas 2015 **Demonstrator.**  
& 2018 HTML and Web-Design
- Michaelmas 2015 **Demonstrator.**  
Introduction into Matlab  
**Humboldt-Universität zu Berlin & Charité Berlin**
- 2010/13/14 **Teaching Assistant.**  
Supervisor at the Physical laboratory for students of Dentistry
- Winter 2009 **Lecturer & Tutor.**  
Introduction to university-level Mathematics for Physicists  
**Teaching Qualifications**
- 2017 Associate Fellowship of the Higher Education Academy
- 2015 Teaching Assistant Training Mathematical Institute University of Oxford

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## Research Supervision

- 3/2020–9/2020 Vedang Joshi (Visiting undergraduate student from the University of Bristol): ‘Mitochondrial protein–protein interaction networks’
- 3/2020–9/2020 Benjamin Wong (Master Thesis in Applied Mathematics, Imperial College London): ‘Topological data analysis of election outcomes’
- 6/2019–9/2019 Yiqian Qian (Master Thesis in Statistical Science, University of Oxford, joint with Gesine Reinert): ‘Ranking Musicians and Concert Venues’
- 7/2019–9/2019 Harrison Green (Research intern, joint with industrial collaborator ADARGA): ‘Edge-prediction in large temporal networks’

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## Outreach

- 4/7/2019 **Speaker**, *Undergraduate Open Day* Mathematical Institute, University of Oxford.  
*Statistics & Probability* for prospective students
- 3/2019–6/2019 **Presenter**, *Oxford Maths Festival* Department of Statistics, University of Oxford.  
Presenting virtual reality experience to the general public
- 3/2019–6/2019 **Virtual Reality Designer**, *Dimensions: the Mathematics of Symmetry and Patterns*  
Ashmolean Museum of Art and Archaeology.  
Creating a virtual reality experience for a general public audience (22k visitors). The exhibition was Highly Commended in Oxford's 'The Vice-Chancellor's Public Engagement with Research Awards 2019'.
- 29/4/2018 **Speaker**, *Oxford Maths Festival* Mathematical Institute, University of Oxford.  
*Networks: Describing an Interconnected World* for general public
- 15/11/2017 **Speaker**, *Graduate Open Day* Mathematical Institute, University of Oxford.  
*Community Detection in Networks* for prospective students
- 28/9/2017 **Speaker**, *Tag der Wissenschaft & Wirtschaft* Humboldt-Gymnasium Eichwalde.  
*Biomathematics and Networks* for high school students
- Summer 2016 **Co-Organiser & Lecturer**, *Schülerakademie*.  
Summer school on *Networks and Complex Systems* for high school students, 16 days
- 2015 **Tutor**, Masterclass.  
*Networks* for middle school students, two 45 min sessions
- 2015 **Translation**, *Network Literacy: Essential Concepts and Ideas from English into German*.

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## Voluntary Work & Services

- 9/12/2019 **Organiser**, *Complexity Oxford Imperial College (COXIC)*.
- 2018–2019 **Postdoctoral Representative**, *Departmental Committee*, Department of Statistics, University of Oxford.
- 2018–2019 **Organiser**, *Networks Seminar*, Mathematical Institute, University of Oxford.
- 2018 **Co-organiser**, *SIAM-IMA Student Chapter Conference*, University of Oxford.
- 2017–2018 **Treasurer**, *SIAM Student Chapter*, University of Oxford.
- 2017–2018 **Member**, *Consultative Committee for Graduate Students*, Mathematical Institute Oxford.
- 2016–2017 **President**, *Middle Common Room*, Kellogg College, (in this position member of various college committees).
- 2015–2016 **Treasurer**, *Middle Common Room*, Kellogg College.
- 2012–2013 **Mentor**, Stanford University in Berlin.
- 2009–2011 **Member**, *Kommission für Lehre und Studium (Committee of Studies)*, Institut für Physik der Humboldt-Universität zu Berlin.
- 2009–2011 **Mentor**, Institut für Physik der Humboldt-Universität zu Berlin.
- 2009–2010 **Co-organiser**, *Zusammenkunft aller Physikfachschaften (Federal Union of all Physics Student Representatives)*, Berlin/Frankfurt.
- Summers **Lifeguard**, Spa Town Karlshagen, Baltic Sea.
- 2007–2009
- 2007–2008 **Editor of the Yearbook**, *Humboldt-Gymnasium*, Eichwalde.

## Peer Review

- Journals *Physical Review E, Journal of Complex Networks, Physical Review Research, PLOS ONE*
- Conferences International Society for Computational Biology 2018
- Other UK Fulbright Commission

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## Scholarships

- 2018 **Grad Student Travel Grant**, *Joint Mathematics Meetings*.
- 2014–2018 **Full Studentship for EU Students**, *EPSRC*.
- 2013 **Leonardo da Vinci**, *European Commission*.
- 2012 **PROMOS**, *German Academic Exchange Service (DAAD)*.
- 2011–2012 **German-American Fulbright Program**.
- 2011–2012 **Full Fee Waiver**, *University of California at Santa Barbara*.
- 2008–2010 **Studienstiftung des Deutschen Volkes**, *German National Academic Foundation*.

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## Membership in Professional Organisations

- 2017–present Royal Statistical Society
- 2016–present Society for Industrial and Applied Mathematics
- 2014–present Complex Systems Society
- 2008–present Deutsche Physikalische Gesellschaft (DPG, German Physical Society)

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## Talks

(**bold** indicates invited talks)

- 24/02/2015 Algebraic Topology Workshop, University Oxford
- 6/2/2015 TOPONETS15 NetSci, Zaragoza
- 21/9/2015 14th Mathematics of Networks Meeting, Oxford
- 23/3/2016 Emphasis Workshop 'Generalized Network Structures & Dynamics', MBI Columbus, Ohio
- 21/9/2016 Conference on Complex Systems, Amsterdam
- 17/5/2017 SIAM Student Conference, Oxford
- 13/6/2017 Cambridge Networks Day ('flash talk' & poster)
- 16/6/2017 SIAM Student Conference, Reading
- 6/9/2017 Mediterranean School of Complex Networks
- 13/9/2017 2nd Symposium on Spatial Networks, Oriel College Oxford
- 10/11/2017 London Mathematical Society Graduate Student Meeting (*Best Talk Award*)
- 29/11/2017 Complex Networks, Lyon
- 10/1/2018 Joint Mathematics Meeting, San Diego
- 17/4/2018 COXIC, Imperial College London
- 25/4/2018 Kellogg College Seminar, Oxford
- 12/6/2018 NetSciEd Satellite, Paris
- 14/6/2018 NetSci, Paris
- 7/12/2018 The Connected Past, University of Oxford

29/8/2019 Cambridge Networks Day ('flash talk', poster & *Best Poster Award*)  
3/9/2019 Single Cell Biology Consortium, University of Oxford  
8/10/2019 **Centre for Complexity Science**, Imperial College London  
30/3/2020 **Networks approaches for Healthcare applications**, University of Exeter

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## Languages

German Native speaker

English Fluent

*UniCERT IV, TOEFL iBT with 107 points (30/28/24/25)*

French Basic

*4 years of high school education, participation in student exchange*

Latin Intermediate

*3 years of high school education*