Dr. Franziska B. Hinkelmann

Software Consultant
Munich, Germany

franziska.hinkelmann@gmail.com
GitHub: github.com/fhinkel

TNG Technology Consulting GmbH, Unterföhring, Germany

Software Consultant, since September 2013

Media and Telecommunication Service Provider:

- Refactoring frontend and business logic (PHP)
- Contributing to rules engine (PHP) based on Rete Algorithm
- Conception and development of REST client (PHP)
- Coordinating product department, QA, and external agencies for planning and development of monthly releases
- Testdriven development with PHPUnit, object oriented programming with PHP 5.3 and PHP 5.5, Composer, Phing, PhpStorm
- Setup continuous integration pipeline with Jenkins
- Development of acceptance tests in JUnit for product information service (Java)
- Contributing to REST service for external partners (Zend Framework)

Real Estate Startup:

- Supervising student trainee
- Frontend: Angular, Backend: Node.js and MongoDB

Co-organizer PHP Usergroup Munich

- Bimonthly meetings
- 380 members

Conducting job interviews

Mathematical Biosciences Institute, Ohio State University, OH

Postdoctoral Fellow, 2011-2013
Mentor: Michael Stillman, Cornell University

Education

Virginia Tech, Blacksburg, VA

Ph.D. Mathematics, August 2011
Reinhard Laubenbacher (Virginia Bioinformatics Institute), Advisor
Algebraic theory for discrete models in systems biology

M.S. Mathematics, May 2007

Universität Karlsruhe, Karlsruhe, Germany

Vordiplom Mathematik, minor **Computer Science**, May 2006

Opensource Contributions

Main contributor to BlitzPay, a cryptocurrency based payment app. Winner at Burda Hackathon *Future of Finance* of the special prize for the highest economic impact by the Bavarian Ministry of Economic Affairs and Media, Energy and Technology, 2015

Main contributor to open source project in Node.js: Web interface for research tool for algebraic geometry, used in courses at Harvard, Cornell, and UC Berkeley, web.macaulay2.com

Contributor to Mockery, PHP mock object framework, 2014

Publications

A Web Application for Macaulay2, L. Kastner, **F. Hinkelmann**, M. Stillman, 2015, under review

Steady state analysis of Boolean molecular network models via model reduction and computational algebra, A. Veliz-Cuba, B. Aguilar, **F. Hinkelmann**, R. Laubenbacher, BMC Bioinformatics, 2014, DOI: 10.1186/1471-2105-15-221

Inferring Biologically Relevant Models: Nested Canalyzing Functions, **F. Hinkelmann**, A. Jarrah, ISRN Biomathematics, 2012, DOI: 10.5402/2012/613174

ADAM: Analysis of Discrete Models of Biological Systems Using Computer Algebra, **F. Hinkelmann**, M. Brandon, B. Guang, R. McNeill, G. Blekherman, A. Veliz-Cuba, R. Laubenbacher, BMC Bioinformatics, 2011, DOI: 10.1186/1471-2105-12-295

Fast Gröbner Basis Computation for Boolean Polynomials, **F. Hinkelmann**, E. Arnold, 2010, arXiv.org

A Mathematical Framework for Agent Based Models of Complex Biological Networks, **F. Hinkelmann**, D. Murrugarra, A. Jarrah, R. Laubenbacher, Bulletin of Mathematical Biology, 2010, DOI: 10.1007/s11538-010-9582-8

Parameter estimation for Boolean models of biological networks, E. Dimitrova, L. García-Puente, **F. Hinkelmann**, A. Jarrah, R. Laubenbacher, B. Stigler, M. Stillman, P. Vera-Licona, Journal of Theoretical Computer Science, April 2010, DOI: 10.1016/j.tcs.2010.04.034

Boolean Models of Bistable Biological Systems, **F. Hinkelmann**, R. Laubenbacher, Journal of Discrete and Continuous Dynamical Systems - Series S (DCDS-S) 4-6 December 2011 special issue on Biomathematics, DOI: 10.3934/dcdss.2011.4.1443

Book Chapters

Algebraic models and their use in systems biology, R. Laubenbacher, **F. Hinkelmann**, D. Murrugarra, A. Veliz-Cuba, Discrete and Topological Models in Molecular Biology, edited by Natasa Jonoska and Masahico Saito, Springer, ISBN: 9783642401923, 2013

Agent-based models and optimal control in biology: an algebraic approach, **F. Hinkelmann**, M. Oremland, R. Laubenbacher, Mathematical Concepts and Methods in Modern Biology, Edited by Raina Robeva and Terrell Hodge, Elsevier, ISBN: 9780124157804, 2013

Finite Fields in Biology, **F. Hinkelmann**, R. Laubenbacher, Handbook on Finite Fields, edited by Gary Mullen and Daniel Panario, CRC Press, ISBN: 9781439873786, 2013

RESEARCH GRANTS

Collaborator on NSF Award #1146819 *Collaborative Research: ABI Innovation: PlantSimLab: A Simulation Laboratory for Plant Biology*, awarded amount $881,510, 2012

INVITED TALKS

Nordic.js, *A Trip to the Zoo (JavaScript engines)*, September 10-11, 2015, Stockholm, Sweden

.concat(), the web development conference in Austria, *Mobile Web Apps with Native App Features*, March 7, 2015, Salzburg, Austria

PHPBenelux Conference, Workshop *From nightmare legacy code to a professional PHP application in 3 hours*, January 23, 2015, Antwerp, Belgium

The National Alliance for Doctoral Studies in the Mathematical Sciences, Field of Dreams Conference, November 2, 2012, Tempe, AZ

MBI (Mathematical Biosciences Institute), Plenary Talk, Workshop: Algebraic Methods in Evolutionary and Systems Biology, May 2012, Columbus, OH

Colorado State University, Applied Mathematics Seminar, April 4, 2012, Fort Collins, CO

Virginia Tech, Department of Mathematics, Colloquium, *Algebraic theory for discrete models in systems biology*, March 16, 2012, Blacksburg, VA

AWM (Association for Women in Mathematics) Workshop in conjunction with the Joint Mathematics Meeting, January 7, 2012, Boston, MA

SACNAS (Society for Advancing Hispanics/Chicanos and Native Americans in Science), Discrete Systems Biology: Unlocking Nature's Secrets One Step at a Time, October, 2011, San Jose, CA

Georgia Tech, Mathematical Biology Seminar, September 21, 2011, Atlanta, GA

Clemson University, Algebraic Geometry Seminar, *Parameter Estimation for "biologically relevant" polynomial dynamical systems*, March 17, 2011, SC

Duke University, Algebraic Geometry Seminar, *Analysis of Discrete Models of Biological Systems Using Computer Algebra*, January 26, 2011, Durham, NC

North Carolina State University, Symbolic Computation Seminar, *Analysis of Discrete Models of Biological Systems Using Computer Algebra*, December 1, 2010, Raleigh, NC

Karlsruhe Institute of Technology, Seminar Institut für Wissenschaftliches Rechnen und Mathematischer Modellbildung), *Algebraic Varieties in Systems Biology*, November 5, 2010, Germany

---

WORKSHOPS ORGANIZED

MBI (Mathematical Biosciences Institute) Workshop for Young Researchers in Mathematical Biology (WYRMB), organized jointly with R. Leander, September 2012, Columbus, OH

Wake Forest University, School of Medicine Workshop together with R. Laubenbacher, *Mathematical Modeling in Cancer Biology*, March 25, 2011, Winston-Salem, NC

Math Institutes Modern Math Workshop Mini-course together with R. Laubenbacher, *Mathematics and the Systems Biology of Cancer*, September 29-30, 2010, Anaheim, CA

MENTORING

Team Investigation, May 2013, Columbus, OH
Led a team of five undergraduate students over the course of two weeks, investigating a publication in mathematical biology

Mentor Research Experiences for Undergraduates (REU), *Modeling and Simulation in Systems Biology (MSSB)*, Summer 2012, Blacksburg, VA
Chris Miles, Emily Petty, *Sensitivity Analysis for Polynomial Dynamical Systems*

Mentor at Young Mathematicians Conference, Ohio State University, August 19 - 21, 2011, Columbus, OH

Mentor REU, *MSSB*, Summer 2011, Blacksburg, VA

- Led a group of four undergraduates during a ten week project on *Optimal Control for Polynomial Dynamical Systems* and *Translating complex Agent Based Models into Polynomial Dynamical Systems*
- Played large role in conceptual design of the project
- Student presented at *Young Mathematicians Conference* at Ohio State University, August, 2011, Columbus, OH
- Outstanding Presentation award winner at the 2012 Joint Mathematics Meetings MAA Undergraduate Poster Session, *Heuristic Optimal Control on Polynomial Dynamical Systems Expedited by Use of Algebraic Geometry*

Mentor for Undergraduate Research, *Mathematical Modeling for Biologists, Knockout and Knockdown*, Spring 2011, Blacksburg, VA

Mentor for Undergraduate Research, *Database for Discrete Models of Biological Models*, Fall 2010, Blacksburg, VA

Mentor REU, *Modeling and Simulation in Systems Biology (MSSB)*, Summer 2010, Blacksburg, VA

- Resulted in publication: *ADAM: Analysis of Discrete Models of Biological Systems Using Computer Algebra*, **F. Hinkelmann**, M. Brandon, B. Guang, R. McNeill, G. Blekherman, A. Veliz-Cuba, R. Laubenbacher, BMC Bioinformatics, 2011, DOI: 10.1186/1471-2105-12-295

Mentor for **Initiative for Maximizing Student Development (IMSD)** Undergraduate Research, *Network Modeling*, Spring and Summer 2009, Blacksburg, VA

Mentor for Undergraduate Research, *Network Modeling*, Fall 2008, Blacksburg, VA

PRESENTATIONS
POSTERS
PANELS

TNG Winter Retreat Workshop *Stack machines with PHP*, March 13, 2015, Seefeld, Austria

TNG Techday Workshop *Spaß mit Node.js*, February 13, 2015, Unterföhring, Germany

Plant Immunity: Pathways and Translation, Keystone Symposium, *PlantSimLab Software Demonstration*, April 9, 2013, Big Sky, MT

Plant Immunity: Pathways and Translation, Keystone Symposium, Poster *PlantSimLab: a simulations laboratory for plant biology*, April 9, 2013, Big Sky, MT

MBI (Mathematical Biosciences Institute), Postdoctoral seminar, November 8, 2012, Columbus, OH

Society for Mathematical Biology, Annual Meeting, Session for *Agent-based Models of Biological Systems: Approximation and Control*, *Algebraic Framework for Agent-based models*, July 26, 2012, Knoxville, TN

Ohio State University, RUMBA Undergraduate Seminar in Mathematical Biology, *Inhibiting tumor growth of melanoma cells*, April 3, 2012, Columbus, OH

MBI, Institute Partner Meeting, Poster *Using Systems Biology Approach to Identify Potential Targets for Therapy in Melanoma cells*, February 12, 2012, Columbus, OH

NIMBioS (National Institute for Mathematical and Biological Synthesis), *Optimal Control on Polynomial Dynamical Systems Expedited by Use of Algebraic Geometry*, Working Group Agent-Based Models of Biological Systems, December 13, 2011, Knoxville, TN

Ohio Wesleyan University, Science Lecture Series, *Discrete Models in Systems Biology*, November 3, 2011, Delaware, OH

Ohio Wesleyan University, Mathematics Colloquium, *Algebraic theory for discrete models in systems biology*, November 3, 2011, Delaware, OH

Center for Mathematical Medicine at Nationwide Children's Hospital, Seminar, September 29, 2011, Columbus, OH

MBI, Postdoctoral Seminar, *Algebraic theory for discrete models in systems biology*, September 8, 2011, Columbus, OH

Young Mathematicians Conference, Ohio State University, *Panel: Graduate School Orientation Session*, August 21, 2011, Columbus, OH

Virginia Bioinformatics Institute, PhD defense *Algebraic theory for discrete models in systems biology*, August 1, 2011, Blacksburg, VA

Virginia Tech Department of Mathematics, Graduate Seminar *Writing a good CV, research statement, and teaching statement*, April 7, 2011, Blacksburg, VA

Virginia Tech Department Graduate Student Assembly, Research Symposium *Algebraic Framework for Discrete Models in Systems Biology*, March 23, 2011, Blacksburg, VA

Virginia Tech Department of Mathematics, Visitors' Day *Polynomial Dynamical Systems in Cancer Biology*, March 18, 2011, Blacksburg, VA

Universität Göttingen, Macaulay2 Workshop *Parameter Estimation for "Biologically Relevant" Polynomial Dynamical Systems*, March 3, 2011, Göttingen, Germany

Virginia Tech Department of Mathematics, Research Days *Mathematics of Systems Biology*, October 29, 2010, Blacksburg, VA

Virginia Tech Student Chapter of SIAM, Student Research Seminars *Algebraic Varieties in Systems Biology*, October 20, 2010, Blacksburg, VA

MBI (Mathematical Biosciences Institute), Workshop for Young Researchers in Mathematical Biology (WYRMB), Poster *ADAM: Analysis of Discrete Models of Biological Systems Using Computer Algebra*, August 30-September 1, 2010, Columbus, OH

SIAM (Society for Industrial and Applied Mathematics) Southeastern-Atlantic Section Conference *Mathematical Framework for Agent Based Models and Optimal Control*, Mathematical Modeling in Life Sciences: Control and Optimization, Part 2, March 2010, Raleigh, NC

AMS (American Mathematical Society) **Joint Mathematics Meeting** Panel Discussion *Finding a Research Topic and Thesis Advisor*, MAA Committee on Graduate Students and the Young Mathematicians' Network, January, 2010, San Francisco, CA

SAMSI (Statistical and Applied Mathematical Sciences Institute) Working Group *Random Delay Networks*, February 4, 2009, Research Triangle Park, NC

AMS Joint Mathematics Meeting *A General Method to derive a Boolean Model from a Continuous Model for Gene Regulatory Networks*, January 6, 2009, Washington, DC

Virginia Tech Physics Department, Graduate Student Seminar *Gene Regulation in the Lac Operon*, September 12, 2008, Blacksburg, VA

Virginia Tech Student Chapter of SIAM, Student Research Seminars *General Method to Transition from a Continuous Model to a Discrete Network*, September 3, 2008, Blacksburg, VA

SIAM Annual Meeting *Understanding Dynamics of Gene Regulation Using a Discrete Model*, July 7-11, 2008, San Diego, CA

Honors

AWM Travel Award AWM Workshop in conjunction with the Joint Mathematics Meeting, January 4-7, 2012, Boston, MA

MBI Postdoctoral Fellow 2011-2014

Steeneck Fellowship 2010-2011

AMS Travel Award Joint Mathematics Meeting, January 13-16, 2010, San Francisco, California

SACNAS Travel Scholarship (Advancing Hispanics/Chicanos and Native Americans in Science), Improving the Human Condition: Challenges for Interdisciplinary Science, October 15-18, 2009, Dallas, Texas

SIAM Travel Award SIAM Annual Meeting, July 6-10, 2009, Denver, Colorado

SIAM Student Chapter Certificate of Recognition 2009, faculty advisor Lizette Zietsman

SIAM Student Travel Award SIAM Annual Meeting, July 7-11, 2008, San Diego, California

Hatcher Fellowship Summer 2008

Baden-Württemberg Stipendium Scholarship 2006-2007

Selected Workshops

Kanban Training, January 24, 2014, Unterföhring, Germany

Macaulay2 Workshop, January 6 - 10, 2014, Berkeley, California

SQL Workshop, December 13, 2013, Unterföhring, Germany

Working Group **Agent-Based Models of Biological Systems: Pathways to control and optimization**, NIMBioS (National Institute for Mathematical and Biological Synthesis), November 27-29, 2012, Knoxville, TN

MBI BioSciences Problem-Solving Workshop, **Mathematical model of blood calcium ion regulation**, July 16-20, 2012, Columbus, OH

Working Group **Agent-Based Models of Biological Systems: Pathways to control and optimization**, NIMBioS (National Institute for Mathematical and Biological Synthesis), December 13-15, 2011, Knoxville, TN

Macaulay2 Workshop, Institute for Mathematics and Its Applications, July 25-29, 2011, Minneapolis, MN

Macaulay2 Workshop, Courant Center for Higher Order Structures, February 28 - March 5, 2011, Göttingen, Germany

AIM (American Institute of Mathematics) **Parameter identification in graphical models**, October 4-8, 2010, Paolo Alto, California

MBI Bootcamp in Cancer Modeling, September 7-10, 2010, Columbus, Ohio

Macaulay2 Workshop, August 7-13, 2010, Colorado Springs, Colorado

Macaulay2 Workshop, January 7 - 13, 2010, Berkeley, California

MSRI Graduate Workshop Toric Varieties, June 15-26, 2009, Berkeley, California

---

Association Memberships

Grace Hopper Celebration of Women in Computing Conference (GHC)

Poster Committee member, 2015

SIAM Student Chapter at Virginia Tech

President, 2008 - 2009
Organized Student Research Seminar, visiting speakers program, field trip to Joint Mathematics Conference, Minisymposia, website maintenance

---

Teaching Experience

Universität Bremen, Bremen, Germany

Lecturer, August 2015
Agile Software Development: A Node.js application in one week
2 Credit Points (ECTS)

Fachhochschule Furtwangen, Furtwangen, Germany

Lecturer, Juli 2015
Einführung zur testgetriebenen Entwicklung mit PHP

Universität Bremen, Bremen, Germany

Lecturer, August 2014
Agile Software Development: A Node.js application in one week
2 Credit Points (ECTS)

Virginia Tech

Course Instructor - Integral Calculus, Summer 2009

- Lectured five times a week for a class of 32 undergraduate students
- Created syllabus
- Wrote and graded course exams
- Assigned grades to students

Course Instructor - Computer-tested Integral Calculus, Spring 2009

Course Instructor - Differential Calculus, Fall 2007 - Fall 2008

Instructional Assistant, Fall 2006

- Assisted students with math concepts and software questions

Universität Karlsruhe

Numerical Analysis Programming Lab Instructor, Spring 2006

- Instructed students once a week and graded C++ and Java exercises

Linear Algebra and Real Analysis Recitations, Spring 2005 - Spring 2006

- Lectured once a week for a class of 70 undergraduate students
- Graded homework and exams

Other Work Experience

EnBW Trading GmbH, Karlsruhe, Germany, Summer 2007

Internship Methods and Models at EnBW Trading GmbH

- Research on energy consumption and production in Europe.

United Internet AG, Karlsruhe, Germany, 2001 - 2006

Unix System Developer

- Responsible for planning, programming and testing of software, mainly written in C, C++
- Projects included Voice over IP server software and low level storage software.

LANGUAGES

Fluent: German (Native), English, Italian
Basic: French, Spanish

REFERENCES

Reinhard Laubenbacher, reinhard@vbi.vt.edu, Virginia Tech, Virginia Bioinformatics Institute, PhD advisor

Mike Stillman, mike@math.cornell.edu, Cornell University, Department of Mathematics