

CURRICULUM VITAE

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PERSONAL

Citizen of Switzerland.

Married to Isabelle Chen-Angliker, M.D., specialized in pediatrics, University of Zürich.
Two children; Leonard, born in 2003, and Celia, born in 2007.

EMPLOYMENT HISTORY

- 2008 - Assistant Professor of Mathematics, University of Texas at Austin.
(on leave in the academic year 2007/08)
- 2004 - 2008 Assistant Professor of Mathematics, Princeton University.
- 2001 - 2004 Courant Instructor, Courant Institute, NYU.
Mentored by Prof. Horng-Tzer Yau (now at Harvard University).

EDUCATION

- 2001 Ph.D. Mathematical Physics, ETH Zürich.
Thesis advisor Prof. Jürg Fröhlich. Coadvisor Prof. Gian-Michele Graf.
- 1999 Ph.D. Mechanical Engineering (Analytical Dynamics), ETH Zürich.
Thesis advisor Prof. Hans Brauchli. Coadvisor Prof. Eduard Zehnder.

RESEARCH INTERESTS

Analysis, Mathematical Physics.

GRANTS

National Science Foundation Grant DMS-1009448, 2010 - 2013, PI.

National Science Foundation Grant DMS-0704031 / DMS-0940145, 2007 - 2010, PI.

National Science Foundation Grant DMS-0407644 / DMS-0524909, 2004 - 2007, PI.

NYU Research Challenge Fund Award 2003 - 2004.

MENTORING

Dr. Itaru Sasaki (Ph.D. 2007, Hokkaido University), postdoctoral mentoring 2007/08 at Princeton University. *Current position:* Tenure track assistant professor, Shinshu University (since 2009).

Aynur Bulut, graduate student at UT Austin, mentoring of a research project on the dynamics of nonlinear Hartree hierarchies, jointly with N. Pavlović.

Jason Jo and Chirag Barai, graduate students at UT Austin, reading courses in Spring 2010.

Boyi Yang, undergraduate student at UT Austin, reading courses in Fall 2009 and Spring 2010.

DOCTORAL THESIS COMMITTEE

Daniel Blazevisky, UT Austin, mathematics (advisor Rafael de la Llave).

Victor Chua, UT Austin, physics (advisor Gregory Fiete).

INVITED LECTURE SERIES

2007 "Renormalization and Spectral Analysis in QED", Kyushu U. (June, five 2 h lectures).

PROFESSIONAL SERVICES

National Science Foundation panel in 2006 and 2008.

Refereeing for Duke Mathematical Journal, Journal of Functional Analysis, Communications in Mathematical Physics, Journal of Statistical Physics, Reviews in Mathematical Physics, Annales Henri Poincaré, Journal of Mathematical Physics, Symmetry Integrability and Geometry, Abh. math. Semin. Univ. Hamburg.

PROFESSIONAL AFFILIATIONS

American Mathematical Society.

International Association of Mathematical Physics.

INVITED VISITS

- 2010 Erwin Schrödinger Institute, 1 week (June).*
ETH Zürich, 1 week (May), invited by Prof. J. Fröhlich.*
- 2009 Kyoto University, 1 week (September), invited by Prof. K. Ito.
ETH Zürich, 1 week (June/July), invited by Prof. J. Fröhlich.
Princeton University, 1 week (January), invited by Prof. I. Rodnianski.
- 2008 University of Toronto, 1 week (March), invited by Prof. I.M. Sigal.
Erwin Schrödinger Institute, University of Vienna. Had to decline.
- 2007 Kyushu University, Japan, 1 week (May), invited by Profs. K. Ito and F. Hiroshima.
University of Heidelberg, Germany, 1 week (March), invited by Prof. V. Bach.
- 2006 University of Texas at Austin, 1 week (November).
Kyushu University and RIMS, Kyoto University, Japan, 2 weeks (September),
invited by Profs. K. Ito and I. Ojima.
Erwin Schrödinger Institute, University of Vienna, 1.5 weeks (June).*
- 2005 CTS, ETH Zürich, and Dept. of Mathematics, Mainz Univ., 2 weeks (June),
invited by Profs. J. Fröhlich and V. Bach.
Department of Mathematics, University of Notre Dame, 1 week (May),
invited by Prof. I.M. Sigal.
LMU Munich, 1 week (April), invited by Prof. H. Siedentop.
Center of Theoretical Studies (CTS), ETH Zürich, 1 month (Jan), invited by Prof. J. Fröhlich.
- 2004 Department of Mathematics, Stanford University, 1 month (May/June),
invited by Prof. H.-T. Yau.
Department of Mathematics, University of Virginia, 1 week (May), invited by Prof. I. Herbst.*
Department of Mathematics, Stanford University, 2 weeks (Jan), invited by Prof. H.-T. Yau.
- 2003 RIMS, Kyoto University, and Dept. of Mathematics, Tokyo University, 2 weeks (Sep),
invited by Profs. I. Ojima, K. Ito, and K. Yajima.
TU and LMU Munich, 1 week (June), invited by Prof. H. Spohn.*
- 2002 Department of Mathematics, University of Toronto, 1 week (May), invited by Prof. I.M. Sigal.

Travel and stay entirely financed by host institution, except for * (travel excluded).

CONFERENCE PRESENTATIONS

- 2010 Invited speaker, Southern California Analysis and PDE Conference, UCLA (scheduled).
Invited speaker, Program "Matter and Radiation", at Erwin Schrödinger Institute, Vienna.
Invited speaker, FRG Workshop in Kinetic Theory, Brown University.
Invited speaker, "Classical and Random Dynamics in Mathematical Physics", UT Austin.
Invited speaker, Program on Quantum Field Theory, NUS, Singapore.
- 2009 Invited speaker, Session on Harmonic Analysis and PDE's, AMS meeting, Waco, TX.
Invited speaker, "Analyt. & num. issues on quantum, kinetic and statist. evol.", UT Austin.
Invited speaker, Oberwohlfach workshop on Dynamics of Quantum Systems.
Invited speaker, "Renormalization Group Methods in Mathematical Sciences",
RIMS, Kyoto University. Three talks.
Invited speaker, "Nonlinear PDE's and Engineering Applications", Banff (August).
- 2008 Invited speaker, "Quantum manybody systems", CMS, Univ. of Montreal, had to decline.
Invited speaker, "Math. Horizons for Quantum Physics", NUS, Singapore, had to decline.
Invited speaker, one hour talk, 26th Western States Meeting on Math Phys, Caltech.
- 2007 Lecture series, Kyushu University (five 2-hour lectures).
Invited speaker, Minisymposium at SIAM conference on PDE's, Arizona.
Invited speaker, Meeting of the German Mathematical Society, Berlin, had to decline.
Main speaker, Meeting of the German Physical Society, University of Heidelberg.
- 2006 Invited speaker, "Current Status of Rigorous Statistical Mechanics & QFT", Kyushu Univ.
Invited speaker, "Evolution of microscopic and macroscopic fields", Banff, had to decline.
Invited speaker, "Analysis of Large Quantum Systems", ESI, Vienna University.
- 2005 Invited speaker, "International Conference on Analysis and Quantum", LMU Munich.
- 2004 Invited speaker, "QMath 9", Giens, France, had to decline.
Invited speaker, "Dynamics in Statistical Mechanics", CMS, University of Montreal.
- 2003 Invited speaker, "Renormalization Group Methods in Mathematical Sciences",
RIMS, Kyoto University. Three talks.
Invited talk, ICMP 2003, Lisbon, Portugal.
- 2002 ICM 2002 Beijing, Short Communications.
Int. Conf. on Differential Equations and Mathematical Physics, UAB, 2002.
- 2001 Invited talk, Oberwohlfach workshop on Quantum Field Theory, had to decline.
- 1998 4th World Congress on Computational Mechanics, Buenos Aires, Argentina, 1998.
ESM Conference, University of Manchester, UK, 1998.
- 1997 NATO Adv. Study Inst. Conf. on Comp. Meth. in Mech., Varna, Bulgaria, 1997.
SIAM 45th Anniversary Conference, Stanford University, 1997.
- 1996 19th International Congress on Theoretical and Applied Mechanics, Kyoto, 1996.

SEMINAR PRESENTATIONS

- 2010 Rice University, *Geometry-Analysis Seminar*.
University of Texas at Austin, *Undergraduate Research Math Club*.
- 2009 University of Texas at Austin, *Analysis and Mathematical Physics Seminar*.
- 2008 University of Texas at Austin, *Analysis Seminar*.
University of Texas at Austin, *Mathematical Physics Seminar*.
University of Toronto, *Applied Mathematics and PDE Seminar*.
Rutgers University, *Mathematical Physics Seminar*.
- 2007 University of Illinois Urbana Champaign, *Special Colloquium*.
- 2006 University of Alabama Birmingham, *Mathematics Colloquium*.
University of Texas at Austin, *Analysis Seminar*.
University of Texas at Austin, *Mathematical Physics Seminar*.
RIMS, Kyoto University, *Mathematical Physics Seminar*.
- 2005 Princeton University, *Mathematical Physics Seminar*.
Ludwig-Maximilians-Universität München (LMU), *Oberseminar Analysis*.
- 2004 Rutgers University, *Mathematical Physics Seminar*.
Invitation to McMaster University, but had to decline.
University of Virginia, *Mathematical Physics Seminar*.
Princeton University, *Mathematical Physics Seminar*.
- 2003 University of Massachusetts, Amherst, *Applied Analysis Seminar*.
University of Tokyo, *Functional Analysis Seminar*.
RIMS, Kyoto University, *Mathematical Physics Seminar*.
University of Geneva, *Mathematical Physics Seminar*.
Technische Universität München, *Mathematical Physics Seminar*.
Ludwig-Maximilians-Universität München, *Mathematical Physics Seminar*.
- 2002 University of California Irvine, *Mathematical Physics Seminar*.
California Institute of Technology, *Mathematical Physics Seminar*.
University of California Davis, *Mathematical Physics Seminar*.
Princeton University, *Mathematical Physics Seminar*.
- 2001 Courant Institute, *Special Analysis Seminar*.
- 2000 Technische Universität München, *Mathematical Physics Seminar*.
Johannes Gutenberg Universität Mainz, *Mathematical Physics Seminar*.

TEACHING EXPERIENCE

- University of Texas at Austin:

Methods of Applied Mathematics I, PDE I. (Graduate courses)

Introduction to Differential Equations. Introduction to Real Analysis. Applied PDE's.

- Princeton University:

Calculus I, II. Introductory Multivariable Calculus (head instructor, multiple times).

Advanced Multivariable Calculus (review lecturer and head instructor).

- New York University:

Abstract Algebra. Calculus II. Discrete Mathematics. Chaos and Dynamical Systems.

- ETH Zürich (TA):

Quantum Field Theory. Theoretical Physics for Mathematicians I, II. Quantum Mechanics I.

Mechanics I ~ III. Multibody Dynamics. Numerical Methods in Mechanics. Introd. Chaos Theory.

Co-supervision of several Diploma (M.S.) students.

BIBLIOGRAPHY

An updated list of publications with links to the papers and preprints can be found under

<http://www.math.utexas.edu/users/tc>

1. (with J. Fröhlich and M. Seifert) "Renormalization group methods: Landau-Fermi liquid and BCS superconductor", *Session LXII of Les Houches summer schools*, F. David, P. Ginsparg, J. Zinn-Justin (eds.), Elsevier, 1996.
2. (with H. Brauchli) "Dynamical behaviour of a constrained system near a singularity of the configuration space", *Proc. 4th World Congr. Comp. Mech.*, Buenos Aires, 1998.
3. "Non-holonomy, critical manifolds and stability in constrained Hamiltonian systems", *Ph.D. Thesis*, Diss-ETH 13017, 1999.
4. "Operator-theoretic infrared renormalization and construction of dressed one-particle states in non-relativistic QED", *Ph.D. Thesis*, Diss-ETH 14203, 2001.
<http://arxiv.org/abs/math-ph/0108021>
(revised and significantly extended version published under reference 16.)
5. (with J. Fuchs) "The Haag-Lopuszanski-Sohnius theorem", *Concise encyclopedia of supersymmetry*, J. Bagger, S. Duplij, W. Siegel (eds.), Kluwer, 2003.
6. (with V. Bach, J. Fröhlich, and I. M. Sigal) "Smooth Feshbach map and operator-theoretic renormalization group methods", *J. Funct. Anal.*, **203** (1), 44-92, 2003.
7. (with V. Vugalter and S. A. Vugalter) "The increase of binding energy and enhanced binding in non-relativistic QED", *J. Math. Phys.*, **44** (5), 2003.
8. (with J. Fröhlich and J. Walcher) "The decay of unstable noncommutative solitons", *Comm. Math. Phys.*, **237** (1-2), 243-269, 2003.
9. (with J.-M. Barbaroux and S. A. Vugalter) "Binding conditions for atomic N -electron systems in non-relativistic QED", *Ann. H. Poinc.*, **4** (6), 1101 - 1136, 2003.
10. "Long-time dynamics and localization lengths for the 3-D Anderson model at weak disorders", *Proceedings ICMP 2003*, World Scientific, 2005.
11. "Critical manifolds and stability in Hamiltonian systems with non-holonomic constraints", *J. Geom. Phys.*, **49** (3-4), 418 - 462, 2004.
12. "Localization lengths and Boltzmann limit for the Anderson model at small disorders in dimension 3". *J. Stat. Phys.*, **120** (1-2), 279 - 337, 2005.
13. "Localization lengths for Schrödinger operators on \mathbb{Z}^2 with decaying random potentials", *Int. Math. Res. Not.*, **2005:54**, 3341-3373, 2005.

14. "Convergence in higher mean of a random Schrödinger to a linear Boltzmann evolution". *Comm. Math. Phys.*, **267**, 355-392, 2006.
15. (with V. Bach, J. Fröhlich, and I. M. Sigal) "The renormalized electron mass in non-relativistic QED". *J. Funct. Anal.*, **243** (2), 426 - 535, 2007.
16. "Infrared renormalization in non-relativistic QED and scaling criticality". *J. Funct. Anal.*, **254** (10), 2555 - 2647, 2008.
17. (with J. Fröhlich) "Coherent infrared representations in non-relativistic QED", *Spectral Theory and Mathematical Physics: A Festschrift in Honor of Barry Simon's 60th Birthday, Proc. Symp. Pure Math.*, AMS, 2007. (Refereed research article)
18. (with J.-M. Barbaroux, V. Vougalter, and S. A. Vougalter) "On the ground state energy of the translation invariant Pauli-Fierz model". *Proc. Amer. Math. Soc.*, **136** (2), 2008.
19. (with J. Fröhlich and A. Pizzo) "Infraparticle scattering states in non-relativistic QED: I. The Bloch-Nordsieck paradigm". *Commun. Math. Phys.*, **294** (3), 761 - 825, 2010.
20. (with J. Fröhlich and A. Pizzo) "Infraparticle scattering states in non-relativistic QED: II. Mass shell properties". *J. Math. Phys.*, **50** (1), 2009.
21. (with I. Sasaki) "Boltzmann limit and quasifreeness for a homogenous Fermi gas in a weakly disordered random medium." *J. Stat. Phys.*, **132** (2), 329-353, 2008.
22. (with J.-M. Barbaroux, V. Vougalter, and S. A. Vougalter) "Quantitative estimates on the Hydrogen ground state energy in non-relativistic QED."
<http://arxiv.org/abs/0903.1854>
23. (with N. Pavlović) "The quintic NLS as the mean field limit of a Boson gas with three-body interactions." *Conditionally accepted by J. Funct. Anal.*
<http://arxiv.org/abs/0812.2740>
24. (with N. Pavlović) "On the Cauchy problem for focusing and defocusing Gross-Pitaevskii hierarchies." *Discr. Contin. Dyn. Syst.*, **27** (2), 715 - 739, 2010.
25. (with N. Pavlović and N. Tzirakis) "Energy conservation and blowup of solutions for focusing Gross-Pitaevskii hierarchies." *Ann. Inst. H. Poinc. (C) Anal. Non Lin.*, to appear.
<http://arXiv.org/abs/0905.2704>
26. (with N. Pavlović) "Higher order energy conservation, Gagliardo-Nirenberg-Sobolev inequalities, and global well-posedness for Gross-Pitaevskii hierarchies."
<http://arxiv.org/abs/0906.2984>
27. (with N. Pavlović) "A short proof of local wellposedness for focusing and defocusing Gross-Pitaevskii hierarchies"
<http://arxiv.org/abs/0906.3277>
28. (with I. Rodnianski) "Boltzmann limit for a homogenous Fermi gas with Hartree-Fock interactions in a random medium"
<http://arxiv.org/abs/0910.2786>

29. (with J. Faupin, J. Fröhlich and I.M. Sigal) "Local decay in non-relativistic QED"
<http://arxiv.org/abs/0911.0828>
30. "Charge Transport in Random Media and Boltzmann Limits for Single Particle and Manybody Models", *Proceedings of the conference "Renormalization Group Methods in the Mathematical Sciences" at RIMS, Kyoto University, in September 2009. To appear.* (45 pages)
31. (with N. Pavlović) "Recent results on the Cauchy problem for focusing and defocusing Gross-Pitaevskii hierarchies", *Math. model. nat. phenom.*, **5** (4), 2010. Spectral problems. Issue dedicated to the memory of M. Birman (V. Volpert, A. Laptev et al., eds.).
32. (with V. Bach, J. Faupin, J. Fröhlich and I.M. Sigal) *Work in progress.*
33. (with A. Bulut and N. Pavlović) *Work in progress.*