

Curriculum Vitae

- D.o.B.: September 14, 1965
- Citizenship: German (US-Resident).

Employment

- 2002 - : The Ohio State University. Associate Professor of Mathematics. (with tenure)
- 1996 - 2002: The Ohio State University. Assistant Professor of Mathematics
- 5/96-9/96: UC Berkeley, Berkeley, CA. *Research Fellow*.
- 1995 - 1996: Institute for Advanced Studies, Princeton, NJ.
Member of School of Mathematics.
- 1992 - 1995: Harvard University, Cambridge, MA.
Benjamin Peirce Lecturer, Assistant Professor of Mathematics.
- 1989-1992: ETH Zürich, Theoretical Physics. *Teaching Assistant.*
- 1986-1989: ETH Zürich, Mathematics. *Teaching Assistant.*

Education

- June 1992: *Doctoral Degree* (with distinction), Thesis advisor: Jürg Fröhlich.
- 1989 - 1992: Graduate Studies, Institute for Theoretical Physics, ETH Zürich.
- Aug. 1989: *Diplom* (Masters degree) Theoretical Physics. Thesis advisor: Jürg Fröhlich.
- 1986-1989: Studies in Theoretical Physics and Mathematics, *Eidgenössische Technische Hochschule*, Zürich.
- Oct. 1985: *Vordiplome* (Bachelors degrees) in Mathematics and Physics.
- 1983-1986 Studies in mathematics and physics at the University of Heidelberg.

Publications

Research Monographs:

- “Non-semisimple Topological Quantum Field Theories for 3-Manifolds with Corners”. *Lecture Notes in Mathematics* **1765** Springer-Verlag, 2001. xi + 375 pages. (over 200 illustrations)(with V. Lyubashenko)
- “Quantumgroups, Quantumcategories and Quantumfieldtheory” *Lecture Notes in Mathematics* **1542**, Springer Verlag, 1993. xiii + 436 pages (Second Edition, 1995).(with J.Fröhlich)

Journal Articles:

- “Homology TQFT’s and the Alexander-Reidemeister Invariant of 3-Manifolds via Hopf algebras and Skein Theory”. *Canad. J. Math.* **55** (2003) 766-821. *arXiv.org: math.GT/0008204*.
- “Towards an algebraic characterization of 3-dimensional cobordisms”. *Contemp. Math.* **318** (2003) 141-173.*arXiv.org: math.GT/0106253*
- ”p-Modular TQFT’s, Milnor Torsion, and the Casson-Lescop Invariant”. *Geom. Topol. Monogr.* **4** (2002) 119-141. *arXiv.org: math.GT/0203256*
- “Integrals for Braided Hopf Algebras”. *J. Pure Appl.* **148** no. 2 (2000). (with Y. Bespalov, V. Lyubashenko, V. Turaev)
- “Bridged Links and Tangle Presentations of Cobordism Categories”. *Adv. Math.* **141** No. 2 (1999) 207-281.
- “Equivalence of a Bridged Link Calculus and Kirby’s Calculus of Links on Non-simply Connected 3-Manifolds”. *Topology Appl.* **87** (1998) 115-162.
- “On the Connectivity of Cobordisms and Half-Projective TQFT’s”. *Commun. Math. Phys.* **198** No. 3 (1998) 535-590.
- “Genealogy of Nonperturbative Quantum-Invariants of 3-Manifolds: The Surgical Family”. in ‘Geometry and Physics’, *Lecture Notes in Pure and Applied Physics* **184**, Marcel Dekker (1996) 503-547.
- “Structuring the Set of Incompressible Quantum Hall Fluids”, *Nucl. Phys.B* **453** (1995) 670-704. (with J.Fröhlich, U.Studer, E.Thiran)
- “Mapping Class Group Actions on Quantum Doubles”. *Commun. Math. Phys.* **168** (1994) 353-388.
- “On Braided Tensorcategories”. *Proceedings of XXII-the International Conference on Differential Geometric Methods in Theoretical Physics, Ixtapa-Zihuatanejo. Kluwer Academic Publishers* (1993) 49-60.
- “Non-Abelian Bosonization in Two Dimensional Condensed Matter Physics”, *Nucl. Phys.B* **374** (1992) 511-542. (with J.Fröhlich, P.A. Marchetti)
- “Universality in Quantum Hall Systems” *Nucl. Phys.B* **374** (1992) 511-542.(with J.Fröhlich)

- “Non-Tannakian Categories in Quantum Field Theory”. ”New Symmetry Principles in Quantum Field Theory”, Cargese, July 15-27; Plenum Press (1991) 449-482.

Preprints and Manuscripts:

- “On the Structure of the Fibonacci TQFT. Part I: Integral Basis, Half-Projectivity, and Johnson Homomorphism”.
- ”Resolutions of p-Modular TQFT’s and Representations of Symmetric Groups”. *arXiv.org: math.GT/0110006*
- “Darstellungen der Quantegruppen und Anwendungen” Diploma Thesis, ETH-Zürich, 1989.

Graduate Students

- Craig Jackson, The Ohio State University.
Masters Thesis: “Braid Group Representations” (2001).
- Anil Pranesachar (Masters 2003)

Awards

- 2003: NSF/DMS 0400017. Conference: *Borders in 3-Dim Topology*
- 2003: MRI/OSU Grant. Conference: *Borders in 3-Dim Topology*
- 1997-1998: Seed Grant, 221807. The Ohio State University.
- 5/96-9/96: DFG: Forscher-Stipendium, Ke 624/1.
- 1995-1996: NSF Grant, DMS-9304580. I.A.S. Princeton.
- 1993 - 1996: NSF Standard Three Year Award, DMS-9305715.
- 1994-1995: Clark Fund, 33-530-0475/2. Harvard University
- 1983 - 1989: Stipend of the *Studienstiftung des Deutschen Volkes* (German National Foundation for Gifted Students).
- 1983: Second Prize at International Physics Olympiad in Bucharest, Romania.

Invited Talks

1990-1993

1. ETH-Zürich, Mathematical Physics Seminar, SWITZERLAND, 1990.
2. Univeristy of Geneva, Conference on Mathematical Physics, SWITZERLAND, 1990.
3. Scuola Normale Superiore, Pisa, ITALY, 1991.
4. Univeristy of Geneva, Department of Mathematics, 1991.
5. Conference “New Symmetry Principles in Quantum Field Theory”, Cargèse, FRANCE, 1991.
6. ETH-Zürich, Theoretical Physics Seminar, SWITZERLAND, 1991.
7. Conference on Mathematical Physics, Monte Véritas, SWITZERLAND, 1992.
8. Harvard University, Physics Department, October 1992.
9. U.C. at San Diego, Department of Mathematics, August 1993.
10. XXII-th International Conference on Differential Geometric Methods in Theoretical Physics, Ixtapa - Zihuatanejo, MEXICO, September 1993.

1994-1996

11. Universität Heidelberg, Fachbereich Mathematik, GERMANY, January 1994.
12. Harvard University, Physics Department, April 1994.
13. U.N.C. at Chapel Hill, Department of Mathematics, April 1994.
14. U.I. at Chicago, Department of Mathematics, September 1994.
15. U.C. at Berkeley, Department of Mathematics, September 1994.
16. Brandeis University , Department of Mathematics, February 1995.
17. Ohio State University, Department of Mathematics, February 1995.
18. Northeastern University, Department of Mathematics, February 1995.
19. University of Toronto, Department of Mathematics, February 1995.
20. Rutgers University, Department of Mathematics, March 1995.
21. ETH-Zürich, Institut für Theoretische Physik, SWITZERLAND, May 1995.
22. Conference on Operads and Homotopical Algebra, CIRM, Luminy, FRANCE, May/June 1995.
23. VII. Inter’l Conference on Symmetry Methods in Physics, JINR, Dubna, RUSSIA, July 1995.
24. Conference on Geometry and Physics, and Workshop on Quantum Invariants of 3-Manifolds, Århus, DENMARK, July/August 1995.
25. Princeton University, Department of Mathematics, October 1995
26. Institute for Advanced Study, January 1996.
27. K.S.U. at Manhattan, Department of Mathematics, May 1996.
28. Universität Heidelberg, Fachberiech Matematik, COLLOQUIUM, GERMANY, May 1996.
29. AMS-Meeting # 914, Lawrenceville, NJ, October 1996.
30. Ohio State University, Department of Mathematics, November 1996.

1997-2000

31. ETH-Zürich, Institut für Theoretische Physik, SWITZERLAND, May 1997.
32. Freie Universität Berlin, Theoretische Physik, GERMANY, May 1997.
33. U.I. at Chicago, Department of Mathematics, August 1997.
34. Ohio State University, Department of Mathematics, November 1997.
35. SUNY Buffalo, AMS-meeting # 943, April 1999.
36. Univeristy of Pennsylvania, seminar talk, June 1999.
37. Free University of Berlin, (mathematical physics), GERMANY, July 1999.
38. ETH-Zürich, department of mathematics, SWITZERLAND, July 1999.
39. UNC at Charlotte, AMS-meeting # 949, October 1999.
40. Univeristy of Michigan, seminar talk, January 2000.
41. Washington D.C., AMS-meeting # 950, January 2000.
42. George Washington Univeristy, "Knots in Washington", January 2000.
43. Univeristy of Southwest Louisiana, AMS-meeting # 954, April 2000.
44. Lehigh University Geometry and Topology Conference, June 2000.
45. Universität zu Köln, COLLOQUIUM, GERMANY, June 2000.
46. Universität Bochum, Fachbereich Matematik, GERMANY, July 2000.
47. Miami University, Oxford OH, Topo2000 Conference, July 2000.
48. Mathematischen Forschungsinsitut Oberwolfach, September 2000.
49. AMS-Meeting # 958, San Francisco, October 2000.
50. Universität Göttingen, COLLOQUIUM, GERMANY, October 2000.
51. Universität Mainz, COLLOQUIUM, GERMANY, December 2000.
52. The Ohio State University, Department of Mathematics 2000.

2001-2004

53. University of Iowa, Department of Mathematics, February 2001.
54. University of Montreal, Conference "Knots in Montreal", April 2001.
55. George Washington University, "Knots in Washington", May 2001.
56. Lehigh University, "Topology and Geometry Conference", June 2001.
57. R.I.M.S. Kyoto, "Low-dimensional topology in the twenty-first century", JAPAN, September 2001.
58. AMS-Meeting # 972, Irvine, CA, November 2001.
59. McMasters University, Department of Mathematics, January 2002.
60. AMS Sectional Meeting # 974, Ann Arbor, MI, March 2002.
61. Workshop "Quantum Topology", M.R.C . Warwick, England, March 2002.
62. AMS Sectional Meeting # 978, Portland, OR, June, 2002.
63. Geometric Topology (A Satellite Conference of ICM 2002) Shaanxi Normal Univeristy, Xi'an CHINA, August 2002.

64. AMS Sectional Meeting # 982, Orlando, FL, November, 2002.
65. Ruhr-Universität Bochum, COLLOQUIUM, GERMANY, December 2002.
66. AMS National Meeting # 983, Baltimore, MD, January 2003.
67. “Knots in Poland”. Banach Center, Warsaw and Bedlewo, POLAND. July, 2003
68. “Knots in Washington XVII”, George Washington University, DC, December 2003.
69. UC San Diego, Mathematics, Topology Seminar, November, 2003.
70. Phoenix, AZ. AMS/MAA Joint National Meeting # 993, January 2004.
71. Louisiana State University, Baton Rouge, COLLOQUIUM, March 2004.
72. LSU, Baton Rouge, Mathematics, Topology Seminar, March, 2004.

Conferences Organized

1. Conference: *“Borders in 3-Dim Topology.”*
The Ohio State University NSF, December 2003. PI and sole organizer.
2. First and Second *Young Mathematicians Conference*
The Ohio State University NSF/VIGRE, 2003 and 2004. Coorganizer.
3. Session on *“Quantum Topology”* and OSU local organizing committee.
AMS-Meeting # 969, Columbus, OH, September 2001.

Lectures and Seminars

Assistant Professor, The Ohio State University:

- 2003/04: One and a half quarter “Multivariable Calculus” (Math 254).
- 2003/04: One quarter “Business Calculus” (Math 131)
- 2003/04: Two quarters “Consortiums Calculus & Analytic Geometry” (Math 151A, 152A).
- 2003/04: One quarter “Linear Algebra” (Math 568).
- 2002/03: Two quarters graduate reading courses in topology.
- 2002/03: One quarter “Introduction to 3-Manifolds” (Math 953).
- 2002/03: Three quarters “Introduction to Topology II-III” (Math 656-657)
- 2001/02: One quarter “Linear Algebra” (Math 568).
- 2001/02: One quarter “Introduction to Skydiving” (PAES 139.07).
- 2001/02: Two quarters “Differential Topology I-II” (Math 866-867)

- 2001/02: Three quarters graduate reading courses in topology.
- 2001/02: One quarter “Consortiums Multivariable Calculus” (Math 254A).
- 2000/01: Two quarters graduate reading courses in topology.
- 2000/01: One quarter “Discrete Mathematics” (Math 366).
- 2000/01: Working Seminar “Finite Type Invariants of Planar Curves and Legendrian Knots.”
- 2000/01: Working Seminar “Complex Dynamics”
- 2000/01: Two quarters “Discrete Mathematics” (Math 366)
- 1999/2000: Working Seminar “Torelli Groups and Applications”.
- 1999/2000: Three quarters “Introduction to Topology I-III” (Math 655-657)
- 1998/99: One quarter “Discrete Mathematics” (Math 366)
- 1998/99: Two quarters “Accelerated Honors Calculus & Analytic Geometry” (Math H161, H162)
- 1997/98: One quarter “Discrete Mathematics” (Math 366)
- 1997/98: Three quarters “Differential Topology I-III” (Math 866-868)
- 1996/97: Four quarters “Calculus & Analytic Geometry” (Math 151)

Assistant Professor, Harvard University:

- 1994/1995: One semester “Dynamical Systems”
- 1994/1995: Two semesters “Multivariable Calculus with Applications”
- 1993/1994: Working Seminar “2-Knots in 4-Space”
- 1993/1994: One semester “Multivariable Calculus”
- 1993/1994: Two semesters “Algebraic Topology I& II”
- 1992/1993: One semester “Multivariable Calculus”
- 1992/1993: One semester “Mathematical Methods in Physics”
- 1992/1993: One semester “Calculus”
- 1992-1995: Referee for several “Senior Theses”.

Teaching Assistant, ETH Zürich:

- 1989-1992: Advising Diploma thesis in theoretical physics.
- 1989-1992: Five semester lectures Theoretical Physics I-V.
- 1989-1992: Two student seminars in theoretical physics.
- 1987-1998: Four lectures in mathematics.