

CURRICULUM VITAE

Professor Dr. Jochen Wambach

NAME: Jochen Wambach
DATE OF BIRTH: July 5, 1950
PLACE OF BIRTH: Wittlich, Germany
PRESENT POSITION: Full Professor, Institute for Nuclear Physics,
Technical University Darmstadt, Germany

HIGHER EDUCATION:

Dr.rer.nat. 1979 Physics Department, University of Bonn
Dipl.Phys. 1976 Physics Department, University of Bonn

RESEARCH AREA: Theoretical nuclear- and hadron physics

- Nuclear structure
- Nuclear astrophysics
- Structure of hadronic matter
- Medium modifications of hadrons
- Relativistic heavy-ion physics
- Effective field theories

POSITIONS HELD:

Director, ECT*, Trento	2016-
Head of the Theory Group 'Hadrons and QCD', GSI, Darmstadt,	2004-2015
Full Professor, Inst. Nucl. Phys., Techn. Univ. Darmstadt,	1996-2016
Adjunct Professor, Department of Physics, UIUC,	1996-
Full Professor, Dept. Phys., UIUC,	1990-1996
Associate Professor, University of Bonn,	1990-1995
Deputy Director, Inst. Nucl. Phys., Forschungszentrum Jülich,	1990-1995
Associate Professor, Department of Physics, UIUC,	1987-1990
Assistant Professor, Department of Physics, UIUC,	1984-1987
Senior Researcher, Inst. Nucl. Phys., Forschungszentrum Jülich,	1983
Research Associate, Department of Physics, SUNY at Stony Brook,	1979-1983

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

German Physical Society
American Physical Society

HONORS AND AWARDS:

- Fellow of the American Physical Society, 2003
- Elected Member of the "Wissenschaftliche Gesellschaft der Universität Frankfurt", 2014
- Elected Member of the Academia Europeae, 2016

SERVICE:

Editor:

- Associate Editor European Journal of Physics A, 2007-2014
- Divisional Editor Physical Review Letters, 2007-2014
- Editorial board: Physik, Journal 2013-2017

Referee:

- International Journal of Modern Physics E
- Nuclear Physics A and B
- Physics Letters B
- Physical Review C and D
- Physical Review Letters
- European Journal of Physics

Agencies:

- Department of Energy, Washington
- Deutsche Forschungsgemeinschaft, Bonn
- Bundesministerium für Bildung und Forschung, Bonn
- National Science Foundation, Washington
- Alexander von Humboldt Stiftung, Bonn
- European Union, Brussels

Committees:

- Program Advisory Committee, LAMPF, 1989-1993
- Program Committee, DNP, American Physical Society, 1991-1993
- Program Advisory Committee, GSI, 1998-2004
- Board of Directors, ECT*, 1999-2002
- National Committee 'Hadronen und Kerne', 2000-2003
- Member of the Senat 'Deutsche Forschungsgemeinschaft', 2002-2008
- Program Advisory Committee, Louvain-la Neuve, 2003-2008
- National Committee 'Hadronen und Kerne', 2004-
- Member of NuPECC 2008-
- Elected Member of the DFG grant Committee 'Particle and Nuclear Physics', 2012-

FRANCESCO PEDERIVA

* PERSONAL EDUCATION

- University of Trento: Degree (Laurea) in Physics, March 1991, 110/110 cum laude
- S.I.S.S.A., International School for Advanced Studies, Trieste: Ph.D. in Condensed Matter Physics, October 1994, 30/30 cum laude

* WORK EXPERIENCE AND MEMBERSHIPS

* Academic curriculum

- University of Trento, Associate Professor, Nuclear and Subnuclear Physics (Nov 2010 - present)

- University of Trento and Bruno Kessler Foundation Trento, Italy
L.I.S.C. - Interdisciplinary Laboratory of Computational Science
Founder and co-director from March 2010 to March 2015.
L.I.S.C. (Laboratorio Interdisciplinare di Scienza Computazionale) is a joint venture of the Bruno Kessler Foundation (FBK) and of the University of Trento. The mission of the laboratory is to investigate a wide range of complex physical systems, by combining different approaches and backgrounds in theoretical and computational physics. The laboratory bears the strong imprinting of my interdisciplinary formation and research, gathering groups working in condensed matter physics, nuclear physics, high energy physics and statistical mechanics. So far LISC was also involved in the Aurora- Science project, aiming to the design and realization of a supercomputing scalable facility for scientific computing.

- University of Trento, Assistant Professor (Ricercatore), Condensed Matter Physics (March 2001 - Oct 2010)

- University of Trento Department of Physics Trento, Italy Postdoctoral associate researcher (assegnista di ricerca), January 1999 - February 2001

- Cornell University, Theory Center and LASSP, Ithaca NY, USA Postdoctoral associate researcher with the Computational Science and Engineering Research Group, January 1997 - December 1998

- University of Trento Department of Physics Trento, Italy Member of technical staff (scientific software development), January 1994 - December 1996

* Affiliations and Collaborations

- I.N.F.N. Italian National Institute for Nuclear Physics
Associated: June-November 1991, February 2004 to December 2004, and since January 2009. (Incarico di ricerca since 2010). Manager of the Trento unit of the Research Project (IS) MB31. Coordinator of the Theory Group at INFN-TIFPA (Trento Institute for Fundamental Physics and Applications) since 2015

- Lawrence Livermore National Laboratory, Livermore, CA, USA
Defense and Nuclear Technology, AX-Division: participating guest November 1998-January 2008. Physics and Life Sciences Directorate, Quantum Simulations Group: visiting scientist since January 2008.

- C.N.R. Italian National Research Council

Member of the DEMOCRITOS National Simulation Center - Trieste (January 2004 - December 2008)

- I.N.F.M. Italian National Institute for the Physics of Matter
Associated member November 1991 - January 2004

- C.N.I.S.M.

Italian InterUniversity consortium for the Physics of Matter Associated member since January 2006 * ECT*

- ECT*, European Center for Theoretical Nuclear Studies and Related Areas
Trento, Italy

Technical-scientific consultant for High Performance Computing July 1999 - July 2004

* TEACHING AND EDUCATION

* Supervised Ph.D. theses

- 2007: Francesco Operetto: "Study of the properties of pure and defective hydrogen crystals with Quantum Monte Carlo Methods"

- 2008: Stefano Gandolfi: "The Auxiliary Field Diffusion Monte Carlo Method for Nuclear Physics and Nuclear Astrophysics"

- 2009: Lucia Dandrea: "Quantum Monte Carlo Methods applied to Strongly Correlated and Highly Inhomogeneous many-Fermion Systems"

- 2010: Alberto Ambrosetti: "Quantum Monte Carlo study of spin orbit effects in confined electrons systems"

- 2011: Paolo Armani "Progress on development of EFT-based NN and accurate NN interaction by Monte Carlo Methods"

- 2011: Emmanuel Autieri: "Development of free energy calculation methods for the study of monosaccharides conformation in computer simulations."

- 2013: Diego Lonardonì: "From Hypernuclei to hypermatter: a Quantum Monte Carlo Study of Strangeness in Nuclear Structure and Nuclear Astrophysics"

- 2015 Alessandro Roggero: "Ground state and dynamical properties of many-body systems by non conventional Quantum Monte Carlo algorithms"

Current Ph.D. Students:

- Lorenzo Contessi: "Effective theories of Lattice Nuclei"

- Lorenzo Andreoli: "Novel Hybrid Quantum Monte Carlo Methods in Coordinates and Configuration Space for Many Nucleon Systems"

* GRANTS

- 2009: Aurora Project (INFN and Autonomous Province of Trento): coordinator of the University of Trento Branch (300.000 EUR)

- PRIN 2007 "Theoretical Modelling and simulation of polymer-based nanostructured biomatrices" National P.I.: Antonio Deriu. Local P.I.: Francesco Pederiva

* OTHER ACTIVITIES

- Referee for Physical Review, Physical Review Letters, EPJ, AJP, and others.

- Referee for the NSF, NSERC, ISCRA.

- 1999-2000 Member of the NuPECC Working Group on Computational Nuclear Physics, coord. by H. Leeb (report published in 2000).

* Organization of Workshops/Conferences

- Organizer of the workshop "Quantum Monte Carlo; Recent Advances and Common Problems in Condensed Matter and Field Theory", ECT*, Trento 3-6/07/2001.

- Co-organizer of the symposium QFS2004 (Trento, July 2004) as Publications Chairman (Journal of Low Temp. Phys., issues Jan-Feb 2005)

- Organizer with L. Pieri, P. Faccioli e P. Zuccato of the collaboration meeting ECT* on "Investigating Protein Dynamics with Theoretical Physics Methods" (May 2005).
- Organizer of the National Workshop "QMCI: Quantum Monte Carlo in Italia": December 2006, with S. Giorgini and M. Boninsegni, November 2008, with S. Giorgini and S. Moroni
- Organizer of the "First Aurora School", September, 20th - October, 1st 2010, ECT*, Trento, Italy
- Organizer of the course "High-performance computing and computational tools for nuclear physics", in the "TALENT- Training the next generation of nuclear physicists" series, June 25th, July 13th 2012, ECT*, Trento
- Organizer of the INT Program "Advances in Quantum Monte Carlo Techniques for Non-Relativistic Many-Body Systems (INT-13-2a)", June 24th to August 2nd, 2013 at the Institute of Nuclear Theory, Washington University, Seattle, WA (USA).

* Participation in financed projects

- PRIN 2001 "Quantum Monte Carlo e Teoria del Funzionale Densità $\bar{\Delta}$ per Nanostrutture Semiconduttrici e Clusters di Fermioni e Bosoni Molecolari" National P.I. L. Reatto (Milano). Local P.I.: Enrico Lipparini
- PRIN 2009: "Approcci ab initio a reazioni con sistemi nucleari ricchi di neutroni e alla loro struttura." National P.I.: Andrea Vitturi. Local P.I.: Giuseppina Orlandini.

* Other Memberships

- Member of the Research Networking Programme "The New Physics of Compact Stars (CompStar)" financed by ESF (February 2008 - February 2013)

* Other academic assignments

- Delegate for International Student Programs, Physics Department, University of Trento, since 2012
- Coordinator of the Honors Program "Percorso di Approfondimento in Fisica" for the bachelor in Physics, University of Trento (2012-2015)
- Coordinator of the S.I.S.S.A. - UNITN Joint Master Degree in Physics. (2010-2013)

* SCIENTIFIC INTERESTS

Many-body theories of inhomogeneous and disordered fermionic and bosonic systems, and in particular: Development of algorithms for Quantum Monte Carlo calculations in nuclear and neutron matter; Many-body theories of electron gas in reduced dimensionality, (quantum wires and quantum dots); General techniques for the solution of the "sign problem" in Monte Carlo methods for many fermions systems;
Methods and application of parallel computing in condensed matter and nuclear theory

* RECENT PUBLICATIONS (Last 5 years)

Roggero Alessandro, Mukherjee Abhishek, Pederiva Francesco (2015).
Constraining the Skyrme energy density functional with quantum Monte Carlo calculations.

PHYSICAL REVIEW. C, NUCLEAR PHYSICS, ISSN: 0556-2813, doi:
10.1103/PhysRevC.92.054303

Barnea N., Contessi L., Gazit D., Pederiva F., Van Kolck U. (2015).
Effective field theory for lattice nuclei.

PHYSICAL REVIEW LETTERS, vol. 114, ISSN: 0031-9007, doi:
10.1103/PhysRevLett.114.052501

Lonardonì Diego, Lovato Alessandro, Gandolfi Stefano, Pederiva Francesco (2015).
Hyperon puzzle: Hints from quantum monte carlo calculations.
PHYSICAL REVIEW LETTERS, vol. 114, ISSN: 0031-9007, doi:
10.1103/PhysRevLett.114.092301

Carlson J., Gandolfi S., Pederiva F., Pieper Steven C., Schiavilla R., Schmidt
K.E., Wiringa R.B. (2015).
Quantum Monte Carlo methods for nuclear physics.
REVIEWS OF MODERN PHYSICS, vol. 87, p. 1067-1118, ISSN: 0034-6861, doi:
10.1103/RevModPhys.87.1067

Ambrosetti Alberto, Silvestrelli Pier Luigi, Pederiva Francesco, Mitas Lubos,
Toigo Flavio (2015).
Repulsive atomic Fermi gas with Rashba spin-orbit coupling: A quantum Monte
Carlo study.
PHYSICAL REVIEW A, ISSN: 1050-2947, doi: 10.1103/PhysRevA.91.053622

Kirscher J., Barnea N., Gazit D., Pederiva F., van Kolck U. (2015).
Spectra and scattering of light lattice nuclei from effective field theory.
PHYSICAL REVIEW. C, NUCLEAR PHYSICS, ISSN: 0556-2813, doi:
10.1103/PhysRevC.92.054002

Lonardonì D., Pederiva F., Gandolfi S. (2014).
Accurate determination of the interaction between Ξ hyperons and nucleons from
auxiliary field diffusion Monte Carlo calculations.
PHYSICAL REVIEW. C, NUCLEAR PHYSICS, ISSN: 0556-2813, doi:
10.1103/PhysRevC.89.014314

Roggero Alessandro, Mukherjee Abhishek, Pederiva Francesco (2014).
Quantum Monte Carlo calculations of neutron matter with nonlocal chiral
interactions.
PHYSICAL REVIEW LETTERS, vol. 112, ISSN: 0031-9007, doi:
10.1103/PhysRevLett.112.221103

Calcavecchia Francesco, Pederiva Francesco, Kalos Malvin H., Kühne Thomas D.
(2014).
Sign problem of the fermionic shadow wave function.
PHYSICAL REVIEW E, STATISTICAL, NONLINEAR, AND SOFT MATTER PHYSICS, vol. 90,
ISSN: 1539-3755, doi: 10.1103/PhysRevE.90.053304

Pederiva Francesco, Roggero Alessandro, Orlandini Giuseppina (2014).
Use of the Sumudu transform to extract response functions from Quantum Monte
Carlo calculations.
JOURNAL OF PHYSICS. CONFERENCE SERIES, vol. 527, ISSN: 1742-6588, doi:
10.1088/1742-6596/527/1/012011

E. Lipparini, F. Pederiva (2013).
Asymmetric nuclear matter studied by time-dependent local isospin density
approximation.
PHYSICAL REVIEW. C, NUCLEAR PHYSICS, ISSN: 0556-2813, doi:
10.1103/PhysRevC.88.024318

D. Lonardonì, F. Pederiva, S. Gandolfi (2013).
Auxiliary Field Diffusion Monte Carlo study of the hyperon- Λ nucleon interaction
in Ξ -hypernuclei.
NUCLEAR PHYSICS. A, vol. 914, p. 243-247, ISSN: 0375-9474, doi:
10.1016/j.nuclphysa.2012.12.001

A. Roggero, F. Pederiva, G. Orlandini (2013).
Dynamical structure functions from quantum Monte Carlo calculations of a proper integral transform.
PHYSICAL REVIEW. B, CONDENSED MATTER AND MATERIALS PHYSICS, vol. 88, p. 094302-1-094302-7, ISSN: 1098-0121, doi: 10.1103/PhysRevB.88.094302

D. Lonardoni, S. Gandolfi, F. Pederiva (2013).
Effects of the two-body and three-body hyperon-nucleon interactions in Ξ hypernuclei.
PHYSICAL REVIEW. C, NUCLEAR PHYSICS, ISSN: 0556-2813, doi: 10.1103/PhysRevC.87.041303

A. Roggero, A. Mukherjee, F. Pederiva (2013).
Quantum Monte Carlo with coupled-cluster wave functions.
PHYSICAL REVIEW. B, CONDENSED MATTER AND MATERIALS PHYSICS, ISSN: 1098-0121, doi: 10.1103/PhysRevB.88.115138

A. Yu. Illarionov, S. Fantoni, F. Pederiva, S. Gandolfi, K. E. Schmidt (2012).
Determination of the finite temperature equation of state of dense matter.
PHYSICS OF ATOMIC NUCLEI, vol. 75, p. 866-869, ISSN: 1063-7788, doi: 10.1134/S1063778812060166

P. Faccioli, F. Pederiva (2012).
Microscopically computing free-energy profiles and transition path time of rare macromolecular transitions.
PHYSICAL REVIEW E, STATISTICAL, NONLINEAR, AND SOFT MATTER PHYSICS, ISSN: 1539-3755, doi: 10.1103/PhysRevE.86.061916

A. Ambrosetti, P. L. Silvestrelli, F. Toigo, L. Mitas, F. Pederiva (2012).
Variational Monte Carlo for spin-orbit interacting systems.
PHYSICAL REVIEW. B, CONDENSED MATTER AND MATERIALS PHYSICS, vol. 85, ISSN: 1098-0121, doi: 10.1103/PhysRevB.85.045115

M.P Lohne, G. Hagen, M. Hjort-Jensen, S. Kvaal, F. Pederiva (2011).
Ab initio computation of the energies of circular quantum dots.
PHYSICAL REVIEW. B, CONDENSED MATTER AND MATERIALS PHYSICS, vol. 84, ISSN: 1098-0121, doi: 10.1103/PhysRevB.84.115302

F. Arias de Saavedra, Malvin H. Kalos, Francesco Pederiva (2011).
Cancellation time for correlated random walkers.
MOLECULAR PHYSICS, vol. 109, p. 2797-2806, ISSN: 0026-8976, doi: 10.1080/00268976.2011.604647

S. a Beccara, P. Faccioli, M. Sega, F. Pederiva, G. Garberoglio, H. Orland (2011).
Dominant folding pathways of a peptide chain from ab initio quantum-mechanical simulations.
THE JOURNAL OF CHEMICAL PHYSICS, vol. 134, ISSN: 0021-9606, doi: 10.1063/1.3514149

M. Sega, E. Autieri, F. Pederiva (2011).
Pickett angles and Cremer, Åipole coordinates as collective variables for the enhanced sampling of six-membered ring conformations.
MOLECULAR PHYSICS, vol. 109, p. 141-148, ISSN: 0026-8976, doi: 10.1080/00268976.2010.522208

A. Ambrosetti, F. Pederiva, E. Lipparini (2011).
Quantum Monte Carlo study of circular quantum dots in presence of Rashba interaction.
PHYSICAL REVIEW. B, CONDENSED MATTER AND MATERIALS PHYSICS, vol. 83, ISSN: 1098-0121, doi: 10.1103/PhysRevB.83.155301

A. Ambrosetti, J.M. Escartin, E. Lipparini, F. Pederiva (2011).
Spin-orbit excitations of quantum wells.
EUROPHYSICS LETTERS, vol. 94, ISSN: 0295-5075, doi: 10.1209/0295-5075/94/27004

* Bibliometrics (from ISI, updated on 12/14/2015)

Number of publications: 107
First publication year: 1991
Sum of the Times Cited : 1235
Sum of Times Cited without self-citations : 1026
Citing Articles : 811
Citing Articles without self-citations : 739
Average Citations per Item : 11.54
h-index : 21

Sanjay Reddy

Institute for Nuclear Theory
MS 351550, Department of Physics
University of Washington
Seattle, WA 98195, USA

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FAX: 206-685-9829

Education

Ph. D. Physics, State University of New York, Stony Brook, 1998
M. Sc. Physics, Indian Institute of Technology (IIT), Chennai 1991-1993
B. Sc. (Honors), St. Stephens College, Delhi 1988-1991

Professional Experience

Professor of Physics	07/2011–present
University of Washington, Seattle, WA	
Senior Fellow	07/2011–present
Institute for Nuclear Theory, University of Washington, Seattle, WA	
Staff Scientist	10/2002–06/2011
Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM	
Postdoctoral Fellow	07/2001–09/2002
Center for Theoretical Physics, Massachusetts Institute of Technology, MA	
Postdoctoral Fellow	07/1998–06/2001
Institute for Nuclear Theory, University of Washington, Seattle, WA	

Honors and Awards

Fellow, American Physical Society, 2009
President's Award, 1998 for outstanding thesis research, SUNY, Stony Brook.

Five Recent Publications

1. Rapid neutrino cooling in the neutron star MXB 1659-29, E. F. Brown, A. Cumming, F. J. Fattoyev, C.J. Horowitz, D. Page, S. Reddy, *Phys.Rev.Lett.*120, 182701 (2018).
2. Constraining the speed of sound inside neutron stars with chiral effective field theory interactions and observations, Ingo Tews, Joseph Carlson, S. Gandolfi, S. Reddy. arXiv:1801.01923, (2018) (accepted for publication in the *Astrophysical Journal*).
3. Nuclear pasta in hot dense matter and its implications for neutrino scattering, A. Roggero, J. Margueron, L. F. Roberts, S. Reddy, *Phys.Rev.* C97, 045804 (2018)
4. Energy Conservation and the Chiral Magnetic Effect, D. B. Kaplan, S. Reddy, S. Sen, *Phys.Rev.* D96 016008 (2017).
5. Dispersion and decay of collective modes in neutron star cores, D.N. Kobyakov, C.J. Pethick, S. Reddy, A. Schwenk, *Phys.Rev.* C96, 025805 (2017).

Five Other Significant Publications

1. Dense Matter in Compact Stars: Theoretical Developments and Observational Constraints, Dany Page, Sanjay Reddy. *Ann. Rev. Nucl. Part. Sci.* 56, 327-374, 2006.
2. Forecasting neutron star temperatures: predictability and variability, Dany Page, Sanjay Reddy, *Phys.Rev.Lett.* 111, 241102 (2012).

3. Proto-Neutron Star Cooling with Convection: The Effect of the Symmetry Energy, L.F. Roberts, G. Shen, V. Cirigliano, J.A. Pons, S. Reddy, S.E. Woosley, Phys.Rev.Lett. 108, 061103 (2012).
4. Superfluid Pairing Gap in Strong Coupling, J. Carlson, Sanjay Reddy, Phys.Rev.Lett. 100, 150403 (2008).
5. Evolution of protoneutron stars, J.A. Pons, S. Reddy, M. Prakash, J.M. Lattimer, J.A. Miralles. Astrophys.J. 513. 780, 1999.

Synergistic Activities

PI: DOE Topical Collaboration to study "Neutrinos and nucleosynthesis in hot and dense matter", 2010-2015.

Co-PI: NSF hub "Network in Neutrinos, Nuclear Astrophysics, and Symmetries", 2016-2021; NSF Physics Frontiers Center, Joint Institute for Nuclear Astrophysics-Center for the Evolution of Elements, 2015-2020.

Service: Editor Physics Reports and International Journal of Modern Physics E. Member of the executive board FRIB Theory Alliance and the scientific board European Center for Theoretical Physics (ECT*)

Organizer: Doctoral training program in "Nuclear, Neutrino and Relativistic Astrophysics", ECT*, Trento, Italy, 2016. **Co-organizer:** TALENT school on "Nuclear and Neutrino Physics of Neutron Stars and Supernova", 2015; INT program on "Binary Neutron Star Coalescence as a Fundamental Physics Laboratory", 2014.

Collaborators and Co-Editors: 48 months

Bridget Bertoni (SLAC)	Paulo Bedaque(UMD)	Edward Brown(MSU)
Joseph Carlson(LANL)	Nicolas Chamel(U. Brussels)	Andrew Cumming (McGill)
Stefano Gandolfi (LANL)	Jeremy Holt (Texas A&M)	Charles Horowitz(IU)
David Kaplan(UW)	Ann Nelson(UW)	Dany Page(UNAM)
Christopher Pethick(NBI)	Luke Roberts(MSU)	Alessandro Roggero(UW)
Ermal Rrapaj(U. Guelph)	Achim Schwenk (TU Darmstadt)	Srimoyee Sen (U. Arizona)

Graduate and Postdoctoral Advisors

Graduate Advisor: M. Prakash (OU)

Postdoctoral Advisors: W. Haxton (UCB), D. Kaplan (UW), K. Rajagopal(MIT)

Graduate Students and Postdoctoral Advisees

Mackenzie-Barton Rowledge(UW) - Graduate Student (2014-Present)
 Bridget Bertoni(SLAC) - Graduate Student (2012-2015)
 Ermal Rrapaj (U. Guelph) - Graduate Student (2012-2016)
 Srimoyee Sen (U. Arizona) - Postdoc (2017-Present)
 Kelly Patton (UW) - Postdoc (2016-Present)
 Ingo Tews (UW) - Postdoc (2015-Present)
 Alessandro Roggero (UW) - Postdoc (2015-Present)
 Stephan Stetina (UW)- Postdoc (2015-Present)
 Gang Shen - Postdoc (2010-2013)
 Rishi Sharma (TIFR)- Postdoc (2007-2010)
 Michael Forbes (WSU)- Postdoc (2009-2010)
 Andrew Steiner (UTK)- Postdoc (2004-2006)
 Gautam Rupak (MS)- Postdoc (2002-2004)