

# Curriculum Vitae

Dr. Michael N. Leuenberger  
Professor of Theoretical Condensed Matter Physics  
Nanoscience Technology Center, Department of Physics, and College of Optics and Photonics (CREOL)  
University of Central Florida  
12424 Research Parkway Suite 428  
Orlando, FL 32826, USA

Nationality: Swiss, US  
Mother Tongue: German  
Other Languages: English, French, Spanish  
Cell Phone: +1 (407) 416-3378  
E-mail: [michael.leuenberger@ucf.edu](mailto:michael.leuenberger@ucf.edu)  
Web site: <https://nano.ucf.edu/leuenberger/>

## Education

- 08/04–07/05 *Postdoctoral training*  
University of California San Diego, USA.  
Advisor: Prof. Lu J. Sham.
- 11/02–07/04 *Postdoctoral training*  
University of Iowa, USA.  
Advisor: Prof. Michael E. Flatté.
- 04/2002 Ph. D. in theoretical physics (summa cum laude).  
University of Basel, Switzerland.  
Advisor: Prof. Daniel Loss.  
Dissertation title: *Quantum Dynamics of Large Spins in Molecular Magnets.*
- 1998–2002 Graduate student and teaching assistant at the Institute of Physics, University of Basel, Switzerland, in the condensed matter theory group of Prof. Daniel Loss.
- 03/1998 Diploma in theoretical physics.  
University of Basel, Switzerland.  
Advisor: Prof. Daniel Loss.  
Diploma thesis title: *Spin tunneling in Mn<sub>12</sub>-acetate.*

## Professional Experience

- 08/2017– *Professor of Theoretical Condensed Matter Physics*  
NanoScience Technology Center, Department of Physics, and College of Optics and Photonics (CREOL), University of Central Florida, USA.
- 08/11–07/17 *Tenured Associate Professor of Theoretical Condensed Matter Physics*  
NanoScience Technology Center, Department of Physics, and College of Optics and Photonics (CREOL), University of Central Florida, USA.
- 08/05–08/11 *Tenure-Track Assistant Professor of Theoretical Condensed Matter Physics*

NanoScience Technology Center, Department of Physics, and College of Optics and Photonics (CREOL), University of Central Florida, USA.

08/04–07/05 *Postdoctoral researcher*

University of California San Diego, USA. Group of Prof. Lu J. Sham.

11/02–07/04 *Postdoctoral researcher*

University of Iowa, USA. Group of Prof. Michael E. Flatté.

05/02–10/02 *Postdoctoral researcher*

University of Basel, Switzerland. Group of Prof. Daniel Loss.

1998–2002 *Research and teaching assistant*

University of Basel, Switzerland. Teaching and grading assignments for undergraduate physics courses on classical mechanics, electrodynamics, quantum mechanics, and advanced quantum mechanics.

## Grants

- DARPA: Ultrafast, Uncooled Long Wave Infrared Detection based on Mono-layer Graphene  
PI: Debashis Chanda, Co-PI: Michael Leuenberger, 06/2016-12/2019  
Dollar amount: \$366,512  
Total dollar amount: \$1,302,685
- National Science Foundation (NSF): SHF: Medium: Collaborative Research: Atomic scale to circuit modeling of emerging nanoelectronic devices and adapting them to commercial SPICE simulation package  
Co-PI: Michael Leuenberger, 06/2015-05/2020  
Grant number: ECCS 1514089  
Dollar amount: \$290,003
- National Science Foundation (NSF): Hybrid organic-inorganic metal-semiconductor nanoparticles for highly efficient solar cell concentrators  
PI: Michael Leuenberger, 09/2011-08/2015  
Grant number: ECCS 1128597  
Dollar amount: \$320,190
- Army Research Office (ARO): Are Excitons Localized in Spatially Separated Islands in Semiconductor Quantum Wells Coupled? New Experimental Evidence from 2D Spectroscopy  
PI: Xiaoqin Li, Co-PI: Michael Leuenberger, 12/2010-02/2011  
Grant number: W911NF-08-1-0348  
Dollar amount: \$12,593
- Airforce Office of Scientific Research (AFOSR): Modeling Quantum Network inside Photonic Crystal (PC) made of Quantum Dots (ODs) in Nanocavities by means of Quantum Field Theory  
PI: Michael Leuenberger, 06/2009-05/2015  
Grant number: FA9550-09-1-0450

Dollar amount: \$573,000

- National Science Foundation (NSF): Quantum-field theoretical modeling and simulation of many-body entanglement of excitons and photons in semiconductor structures  
PI: Michael Leuenberger, 06/2009-05/2012  
Grant number: ECCS 0901784  
Dollar amount: \$300,000
- DARPA Young Faculty Award: High-temperature electrically driven Mbps single-photon source at telecom wavelengths  
PI: Michael Leuenberger, 08/2008-02/2010  
Grant number: HR0011-08-1-0059  
Dollar amount: \$139,398
- National Science Foundation (NSF): Modeling of a Photonic Crystal Hosting a Quantum Network Made of Single Spins in Quantum Dots that Interact via Single Photons  
PIs: Winston Schoenfeld, Michael Leuenberger, 09/2007-08/2010  
Grant number: ECCS 0725514  
Dollar amount: \$274,721
- In-house research grants 2006-2007 at the University of Central Florida  
PI: Michael N. Leuenberger, Dollar amount: \$6,220

## IT skills

- Linux system administration, bash scripting
- Classical programming in C, C++, Fortran, Pascal, Python, and MPI
- Computer algebra systems: Mathematica, Matlab
- Microsoft Office Word, Powerpoint, Excel, OneNote
- Origin
- Modeling software: VASP, Abinit, Quantum Espresso, QuantumWise ATK, COMSOL, Lumerical FDTD
- Quantum programming in IBM's Qiskit

## Synergistic activities

- 05-08/2016 Air Force Summer Faculty Fellowship  
*Visiting professor, Air Force Research Lab*  
Wright-Patterson Air Force Base, Dayton, Ohio, USA.
- 05-07/2014 *Visiting professor, Dept. of Physics and Astronomy*  
University of Basel, Switzerland.

- 06–07/2011 *Visiting professor, Dept. of Physics and Astronomy*  
University of Basel, Switzerland.
- 05–06/2009 *Visiting professor, NanoInstitute*  
Universite Pierre et Marie Curie, Paris, France.
- 05–06/2007 *Visiting professor, Dept. of Physics and Astronomy*  
University of Basel, Switzerland.
- 2006– *Member of the Florida Academy of Sciences.*
- 2006– *Consultant for the Ask-A-Scientist Program*  
(through Florida Academy of Sciences) at the Orlando Science Center.
- 03–05/2006 *Visiting professor at the Kavli Institute for Theoretical Physics (KITP) for Workshop on Spintronics*  
University of California, Santa Barbara (UCSB).
- 05/2003 *Visiting scientist*  
University of California, Santa Barbara (UCSB).  
Group of Prof. David D. Awschalom.
- 04/2002 *Visiting scientist*  
University of California, Santa Barbara (UCSB).  
Group of Prof. David D. Awschalom.
- 03/2001 *Visiting scientist*  
University of California, Santa Barbara (UCSB).  
Group of Prof. David D. Awschalom.
- 10/2001 *Participant at the ITP Workshop on Quantum Information*  
University of California, Santa Barbara (UCSB).
- 1999– *Member of the American Physical Society (APS).*
- 1999– *Journal referee*  
Manuscript reviewer for Physical Review Letters, Physical Review A and B, Europhysics Letters.

## Publications including total number of citations

(underlined names indicate people who worked under my supervision, most important publications are marked with \*, preprints are available on the Los Alamos National Laboratory server <http://lanl.arxiv.org/>)

Total number of citations: 3070

### I. Manuscripts in preparation

80. Alireza Safaei, Sayan Chandra, **Michael N. Leuenberger**, and Debashis Chanda  
*Electrical and Thermal Properties of Unpatterned, Half-Patterned and Full-Patterned Graphene*,
79. Alireza Safaei, Sayan Chandra, **Michael N. Leuenberger**, and Debashis Chanda  
*Plasmon-Assisted Detection of Infrared Radiation on Symmetric Full-Patterned Graphene*,

### II. Submitted Papers

78. Muhammad Waqas Shabbir, **Michael N. Leuenberger**  
*Plasmonically enhanced mid-IR light source based on tunable spectrally and directionally selective thermal emission from nanopatterned graphene*,  
arXiv:2005.09560 (2020).
77. Mahtab Khan, Muhammad Waqas Shabbir, Alireza Safaei, Debashis Chanda, and **Michael N. Leuenberger**  
*Edge Scattering-Assisted Intraband Landau Damping in Patterned Graphene and Graphene Nanoribbons*,

### III. Published Papers While at UCF

#### III.a Published Papers after Tenure

76. Alireza Safaei, Sayan Chandra, Muhammad Waqas Shabbir, **Michael N. Leuenberger**, Debashis Chanda  
*Dirac plasmon-assisted asymmetric hot carrier generation for room-temperature infrared detection*,  
Nature Communications **10**, 3498 (2019); 3 citations.
75. Chandriker K. Dass, M. A. Khan, Genevieve Clark, Jeffrey A. Simon, **Michael N. Leuenberger**, Ricky Gibson, Shin Mou, Xiaodong Xu, Joshua R. Hendrickson  
*Ultra-Long Lifetimes of Defect Trapped Single Quantum Emitters in Monolayer WSe<sub>2</sub>/hBN Heterostructures*,  
Adv. Quantum Technol. **2**, 1900022 (2019).
74. Alireza Safaei, Sayan Chandra, **Michael N. Leuenberger**, Debashis Chanda  
*Wide Angle Dynamically Tunable Enhanced Infrared Absorption on Large-Area Nanopatterned Graphene*,  
ACS Nano **13**, 421 (2019); 7 citations.
73. M.A. Khan, **Michael N. Leuenberger**  
*Optoelectronics with single layer group-VIB transition metal dichalcogenides*,  
Nanophotonics **7**, 1589 (2018); 1 citation.

72. Alireza Safaei, A. Vázquez-Guardado, D. Franklin, **Michael N. Leuenberger**, Debashis Chanda  
*High-Efficiency Broadband Mid-Infrared Flat Lens*,  
Advanced Optical Materials **6**, 1800216 (2018); 5 citations.
71. M. A. Khan, **Michael N. Leuenberger**  
*Room-temperature superparamagnetism due to giant magnetic anisotropy in  $MoS_2$  defected single-layer  $MoS_2$* ,  
J. Phys.: Condens. Matter **30**, 155802 (2018); 5 citations.
70. Alireza Safaei, Jean Calderon, Daniel Franklin, Abraham Vazquez-Guardado, Laurene Tetard, Lei Zhai, **Michael N. Leuenberger**, Debashis Chanda  
*Dynamically Tunable Extraordinary Light Absorption in Monolayer Graphene*,  
Phys. Rev. B **96**, 165431 (2017); 21 citations.
69. M. A. Khan, Mikhail Erementchouk, Joshua Hendrickson, **Michael N. Leuenberger**  
*Electronic and Optical Properties of Vacancy Defects in Transition Metal Dichalcogenides*,  
Phys. Rev. B **95**, 245435 (2017); 21 citations.
68. Hari P. Paudel, Alireza Safaei, **Michael N. Leuenberger**  
*Nanoplasmonics in metallic nanostructures and Dirac systems*,  
book chapter in Nanoplasmonics - Fundamentals and Applications (Intech, 2017).
67. Manuel Giraldo, Shashank Sarafa, Hari Paudel, Tamil Sakthivel, Cathrine Shepard, Ankur Gupta, **Michael N. Leuenberger**, and Sudipta Seal,  
*Photoelectrochemical Analysis of Band Gap Modulated  $TiO_2$  for Photocatalytic Water Splitting*,  
Int. J. Hydrogen Energy **42**, 9938 (2017); 2 citations.
66. Mikhail Erementchouk, M. A. Khan, **Michael N. Leuenberger**  
*Dirac electrons in the presence of a matrix potential barrier: application to graphene and topological insulators*,  
J. Phys. Cond. Mat. **28**, 115501 (2016); 6 citations.
65. Ahmed El Halawany, **Michael N. Leuenberger**  
*Electrically driven single photon source at high temperature*,  
J. Phys. Cond. Mat. **28**, 085303 (2016).
64. Mikhail Erementchouk, M. A. Khan, **Michael N. Leuenberger**  
*Optical signatures of states bound to vacancy defects in monolayer  $MoS_2$* ,  
Phys. Rev. B Rapid Communications **92**, 075439(R) (2015); 10 citations.
63. **Michael N. Leuenberger**, Mikhail Erementchouk  
*Deterministic generation of GHZ states using quantum dots in a cavity*,  
SPIE Proc. 9123, Quantum Information and Computation XII, 912301 (2014).
62. Narae Kang, Hari P. Paudel, **Michael N. Leuenberger**, Laurene Tetard, Saiful I. Khondaker  
*Photoluminescence Quenching in Single-Layer  $MoS_2$  via Oxygen Plasma Treatment*,  
J. Phys. Chem. C **118**, 21258-21263 (2014); 131 citations.
61. M. A. Khan, **Michael N. Leuenberger**  
*Two-dimensional Fermionic Hong-Ou-Mandel Interference with massless Dirac Fermions*,  
Phys. Rev. B **90**, 075439 (2014); 11 citations.

60. Ahmed El Halawany, **Michael N. Leuenberger**  
*Decoherence and quantum interference assisted electron trapping in a quantum dot*,  
Phys. Stat. Sol. b **251**, 1498-1509 (2014).
59. \* Muhammad R. Islam, Narae Kang, Udai Bhanu, Hari P. Paudel, Mikhail Erementchouk, Laurene Tetard, **Michael N. Leuenberger**, Saiful I. Khondaker  
*Tuning the electrical property via defect engineering of single layer MoS<sub>2</sub> by oxygen plasma*,  
Nanoscale **6**, 10033 (2014); 112 citations.
58. Gabriel González, **Michael N. Leuenberger**  
*Magnetic quantum coherence effect in Ni<sub>4</sub> molecular transistors*,  
J. Phys. Cond. Mat. **26**, 275302 (2014); 2 citations.
57. Volodymyr Turkowski, **Michael N. Leuenberger**  
*Time-dependent density-functional theory of exciton-exciton correlations in the nonlinear optical response*,  
Phys. Rev. B **89**, 075309 (2014); 3 citations.
56. Hari P. Paudel, **Michael N. Leuenberger**  
*Giant Faraday effect due to Pauli exclusion principle in 3D topological insulators*,  
J. Phys. Cond. Mat. FastTrack Comm. **26**, 082201 (2014); 5 citations.
55. Mikhail Erementchouk, **Michael N. Leuenberger**  
*Entanglement dynamics in Second Quantized Quantum Fields*,  
ISRN Math. Phys. **2014**, 264956, 19 pages (2014).
54. Yuri D. Glinka, Zheng Sun, Mikhail Erementchouk, **Michael N. Leuenberger**, Alan D. Bristow,  
Steven T. Cundiff, Allan S. Bracker, Xiaoqin Li  
*Coherent coupling between exciton resonances governed by the disorder potential*,  
Phys. Rev. B **88**, 075316 (2013); 3 citations.
53. Yuri D. Glinka, Zheng Sun, Mikhail Erementchouk, Chandriker K. Dass, **Michael N. Leuenberger**,  
Allan S. Bracker, Xiaoqin Li  
*Non-local coherent coupling between excitons in a disordered quantum well*,  
New J. Phys. **15**, 075026 (2013); 2 citations.
52. \* Hari P. Paudel, **Michael N. Leuenberger**  
*Three-dimensional topological insulator quantum dot for optically controlled quantum memory and quantum computing*,  
Phys. Rev. B **88**, 085316-1 to 085316-17 (2013); 16 citations.
51. \* Volodymyr Turkowski, Suresh Babu, Duy Le, Amit Kumar, Manas K. Haldar, Anil V. Wagh,  
Zongjian Hu, Ajay S. Karakoti, Andre Gesquiere, Benedict Law, Sanku Mallik, Talat S. Rahman,  
**Michael N. Leuenberger**, Sudipta Seal,  
*Linker-Induced Anomalous Emission of Organic-Molecule Conjugated Metal-Oxide Nanoparticles*,  
ACS Nano **6**, 4854-63 (2012); 7 citations.
50. \* Hari P. Paudel, **Michael N. Leuenberger**  
*Light-controlled plasmon switching using hybrid metal-semiconductor nanostructures*,  
Nano Lett. **12**, 2690 (2012); 13 citations.

49. Sergio Tafur, **Michael N. Leuenberger**  
*Spontaneous Creation of Photonic States in Quantum Dots*,  
Reviews in Nanoscience and Nanotechnology **1**, 152 (2012).
48. Mikhail Erementchouk, Volodymyr Turkowski, **Michael N. Leuenberger**  
*Quantum Field Theory of Exciton Correlations and Entanglement in Semiconductor Structures*,  
book chapter, Advances in Quantum Field Theory, Edited by Sergey Ketov (Intech, 2012).
47. \* Gerson J. Ferreira, **Michael N. Leuenberger**, Carlos Egues, Daniel Loss  
*Low-bias negative differential resistance in graphene nanoribbon superlattices*,  
Phys. Rev. B **84**, 125453 (2011); 44 citations.
46. Mikhail Erementchouk, **Michael N. Leuenberger**, Xiaoqin Li  
*2d Fourier spectroscopy of disordered quantum wells*,  
Physica Stat. Sol. (c) **8**, 1141 (2011); 1 citation.
45. \* Shashank Shekhar, Mikhail Erementchouk, **Michael N. Leuenberger**, Saiful I. Khondaker  
*Correlated breakdown of carbon nanotubes in an ultra-high density aligned array*,  
Appl. Phys. Lett. **98**, 243121 (2011); 20 citations.
44. Sergio Tafur, **Michael N. Leuenberger**  
*Computational Model of Single-Photon Near-Field Emission*,  
Proceedings SPIE **8057**, 805704 (2011).
43. H. P. Seigneur, Gabriel González, **Michael N. Leuenberger**, W. V. Schoenfeld  
*Controlled On-Chip Single-Photon Transfer Using Photonic Crystal Coupled-Cavity Waveguides*,  
Advances in OptoElectronics 2011, **893086** (2011), 13 pages; 4 citations.

### III.b Published Papers before Tenure

42. \* Volodymyr Turkowski, Carsten A. Ullrich, Talat S. Rahman, **Michael N. Leuenberger**  
*Time-dependent density-matrix functional theory formalism to study biexcitonic phenomena*,  
Phys. Rev. B **82**, 205208 (2010); 3 citations.
41. Gabriel González, **Michael N. Leuenberger**  
*Quantum Computing in Spin Nano-Systems*,  
book chapter, Handbook of Nanophysics: Nanoelectronics and Nanophotonics, pages 1-1 to 1-22,  
Edited by Klaus D. Sattler (Taylor-Francis, 2010).
40. Gabriel González, **Michael N. Leuenberger**  
*Quantum Spin Tunneling in Molecular Nanomagnets*,  
book chapter, Handbook of Nanophysics: Nanoelectronics and Nanophotonics, pages 9-1 to 9-14,  
Edited by Klaus D. Sattler (Taylor-Francis, 2010).
39. Mikhail Erementchouk, **Michael N. Leuenberger**  
*Nonlinear Optics in Semiconductor Nanostructures (featured on cover page)*,  
book chapter, Handbook of Nanophysics: Nanoelectronics and Nanophotonics, pages 29-1 to 29-20,  
Edited by Klaus D. Sattler (Taylor-Francis, 2010).
38. Gabriel González, **Michael N. Leuenberger**  
*Invited Paper: Dynamics of optically driven  $\Lambda$  transition of the  $^{15}\text{N-V}^-$  center in diamond*,  
Nanotechnology, in Special Issue on Quantum Science and Technology at the Nanoscale, **21**, 274020  
(2010); 1 citation.



37. Mikhail Erementchouk, **Michael N. Leuenberger**  
*Invited Paper: Complex dynamics of the photon entanglement in two-mode Jaynes-Cummings model*,  
Nanotechnology, in Special Issue on Quantum Science and Technology at the Nanoscale, **21**, 274019  
(2010); 1 citation.
36. S. Gangopadhyay, A. Masunov, E. Poalelungi, **Michael N. Leuenberger**  
*Weak antiferromagnetic coupling in molecular ring is predicted correctly by density functional theory  
plus Hubbard U*,  
J. Chem. Phys. **132**, 244104 (2010); 11 citations.
35. Mikhail Erementchouk, **Michael N. Leuenberger**  
*Entanglement of photons due to nonlinear response of quantum wells*,  
Phys. Rev. B **81**, 195308 (2010); 3 citations.
34. Gabriel González, Hubert Seigneur, Winston V. Schoenfeld, **Michael N. Leuenberger**  
*Invited Review Article: Theory of a Scalable Electron-Spin based Quantum Network inside a Pho-  
tonic Crystal*,  
Journal of Computational and Theoretical Nanoscience, Special Issue on "Technology Trends and  
Theory of Nanoscale Devices for Quantum Applications", **7**, 1651-1672 (2010); 2 citations.
33. Hubert Seigneur, Gabriel González, **Michael N. Leuenberger**, Winston V. Schoenfeld  
*Invited Research Article: Dynamics of Entanglement between a Quantum Dot Spin Qubit and a  
Photon Qubit Inside a Semiconductor High-Q Nanocavity*,  
Advances in Mathematical Physics **2010**, 342915 (2010), 31 pages.  
(Special Issue on Quantum Information and Entanglement); 5 citations.
32. M. Combescot, O. Betbeder-Matibet, **Michael N. Leuenberger**  
*Analytical approach to semiconductor Bloch equations*,  
Europhys. Lett. **88**, 57007 (2009); 3 citations.
31. Gabriel González, **Michael N. Leuenberger**  
*The theory of optical  $\Lambda$  transitions in the  $^{15}\text{N-V}^-$  center in Diamond: Role of the hyperfine inter-  
action*,  
Phys. Rev. B Rapid Comm. **80**, 201201(R) (2009); 4 citations.
30. S. Gangopadhyay, A. Masunov, E. Poalelungi, **Michael N. Leuenberger**  
*Prediction of exchange coupling constant for  $\text{Mn}_{12}$  molecular magnet using DFT+U*,  
Lecture Notes in Computer Science **5545**, 151 (2009).
29. Amy V. Thompson, Hubert Seigneur, **Michael N. Leuenberger**, Winston V. Schoenfeld  
*Optical switching based on the conditional Faraday effect with electron spins in quantum dots*,  
IEEE J. of Quantum Electronics, **45** (6), 637-645 (2009); 5 citations.
28. Monique Combescot, **Michael N. Leuenberger**  
*General argument supporting Bose-Einstein condensate of dark excitons in single and double quan-  
tum wells*,  
Solid State Comm. **149**, 567 (2009); 13 citations.
27. Gabriel González, **Michael N. Leuenberger**, Eduardo R. Mucciolo  
*Kondo effect in single-molecule magnet transistors*,  
Phys. Rev. B **78**, 054445 (2008); 54 citations.

26. Mikhail Erementchouk, **Michael N. Leuenberger**, Lu J. Sham  
*Non-perturbative phenomena in semiconductor four-wave mixing spectra*,  
Phys. Rev. B **79**, 085307 (2009); 3 citations.
  25. Mikhail Erementchouk, **Michael N. Leuenberger**  
*Rabi oscillations in semiconductor multi-wave mixing response*,  
Phys. Rev. B **78**, 075206 (2008); 1 citation.
  24. H. P. Seigneur, **Michael N. Leuenberger**, Winston V. Schoenfeld  
*Design of single-photon Mach-Zehnder interferometer based devices for quantum information processing*,  
Proc. SPIE **6903**, 69030C (2008); 1 citation.
  23. H. P. Seigneur, **Michael N. Leuenberger**, Winston V. Schoenfeld  
*Single photon Mach-Zehnder interferometer for quantum networks based on the Single Photon Faraday Effect*,  
J. Appl. Phys. **104**, 014307 (2008); 14 citations.
  22. Amy V. Thompson, Hubert Seigneur, **Michael N. Leuenberger**, Winston V. Schoenfeld  
*Active components in photonic integrated circuits using electron spins in quantum dots*,  
SPIE Proceedings, 6988, 69880H (2008).
  21. \* Mikhail Erementchouk, **Michael N. Leuenberger**, Lu J. Sham  
*Many-body interaction in semiconductors probed with 2D Fourier spectroscopy*,  
Phys. Rev. B **76**, 115307 (2007); 14 citations.
  20. Gabriel González, **Michael N. Leuenberger**  
*Berry-phase blockade in single-molecule magnets*,  
Phys. Rev. Lett. **98**, 256804 (2007); 56 citations.
  19. \* **Michael N. Leuenberger**, Eduardo R. Mucciolo  
*Berry-Phase Oscillations of the Kondo Effect in Single-Molecule Magnets*,  
Phys. Rev. Lett. **97**, 126601 (2006); 102 citations.
  18. **Michael N. Leuenberger**  
*Fault-tolerant quantum computing with coded spins using the conditional Faraday rotation in quantum dots*,  
Phys. Rev. B **73**, 075312 (2006); 27 citations.
- V. Published Papers Before Coming to UCF**
17. **Michael N. Leuenberger**, Lu J. Sham  
*Theory of Umklapp-assisted recombination of bound excitons in Si:P*,  
Journal of Physics: Cond. Mat. **21**, 084218 (2009); 1 citation.
  16. Ralph Schenker, **Michael N. Leuenberger**, Gregory Chaboussant, Daniel Loss, Hans U. Güdel  
*Phonon Bottleneck Effect Leads to Observation of Quantum Tunneling of the Magnetization and Butterfly Hysteresis Loops in  $(\text{Et}_4\text{N})_3\text{Fe}_2\text{F}_9$* ,  
Phys. Rev. B **72**, 184403 (2005); 31 citations.
  15. \* **Michael N. Leuenberger**, Michael E. Flatté, D. D. Awschalom  
*Teleportation of electronic many-qubit states via single photons*,  
Phys. Rev. Lett. **94**, 107401 (2005); 63 citations.

14. **Michael N. Leuenberger**, Michael E. Flatté, D. D. Awschalom  
*Proposal for measuring the entanglement of coupled spins by multiphoton interference*,  
Europhys. Lett. **71**, 387 (2005); 1 citation.
13. **Michael N. Leuenberger**  
*The generalized rotating frame*,  
J. Mag. Mag. Mat. **272-276**, 1974-1975 (2004); 3 citations.
12. **Michael N. Leuenberger**, Daniel Loss, Michael E. Flatté, D. D. Awschalom  
*Discrete Fourier Transform in Nanostructures using Scattering*,  
J. Appl. Phys. **95**, 8167 (2004), 1 citation.
11. **Michael N. Leuenberger**, Daniel Loss  
*The Grover algorithm with large nuclear spins in semiconductors*,  
Phys. Rev. B **68**, 165317 (2003); 27 citations.
10. **Michael N. Leuenberger**, Florian Meier, Daniel Loss  
*Quantum Spin Dynamics in Molecular Magnets*,  
Monatshefte für Chemie **134**, 217-233 (2003); 19 citations.
9. Ralph Schenker, **Michael N. Leuenberger**, Gregory Chaboussant, Hans-U. Güdel, Daniel Loss  
*Butterfly hysteresis and slow relaxation of the magnetization in  $(Et_4N)_3Fe_2F_9$ : Manifestations of a Single-Molecule Magnet*,  
Chem. Phys. Lett. **358**, 413-418 (2002); 11 citations.
8. **Michael N. Leuenberger**, Daniel Loss, M. Poggio, D. D. Awschalom  
*Quantum information processing with large nuclear spins in GaAs semiconductors*,  
Phys. Rev. Lett. **89**, 207601 (2002); 42 citations.
7. \* **Michael N. Leuenberger** and Daniel Loss,  
*Quantum Computing in Molecular Magnets*,  
Nature **410**, 789-793 (2001); 2042 citations.
6. **Michael N. Leuenberger** and Daniel Loss,  
*Spintronics and Quantum Computing: Switching Mechanisms for Qubits*,  
Physica E **10**, 452-457 (2001); 10 citations.
5. **Michael N. Leuenberger** and Daniel Loss,  
*Spin tunneling and topological selection rules for integer spins*,  
Phys. Rev. B **63**, 054414 (2001); 27 citations.
4. **Michael N. Leuenberger** and Daniel Loss,  
*Incoherent Zener tunneling and its application to molecular magnets*,  
Phys. Rev. B **61**, 12200-12203 (2000); 71 citations.
3. **Michael N. Leuenberger** and Daniel Loss,  
*Reply to the comment of Chudnovsky & Garanin on "Spin relaxation in  $Mn_{12}$ -acetate"*,  
Europhys. Lett. **52** (2), 247-248 (2000); 10 citations.
2. **Michael N. Leuenberger** and Daniel Loss,  
*Spin tunneling and phonon-assisted relaxation in  $Mn_{12}$ -acetate*,  
Phys. Rev. B **61**, 1286-1302 (2000); 157 citations.

1. **Michael N. Leuenberger** and Daniel Loss,  
*Spin relaxation in Mn<sub>12</sub>-acetate*,  
Europhys. Lett. **46** (5), 692-698 (1999); 81 citations.

## Patents

**Michael N. Leuenberger**, Michael E. Flatté, David D. Awschalom,  
*Teleportation System For Electronic Many-Qubit States Using Individual Photons*,  
United States Patent, Patent No. US 7,667,995 B1  
Date of Patent: Feb. 23, 2010.

D. Chanda, A. Safaei, **M. N. Leuenberger**,  
*Extraordinary Dynamically Tunable Absorption in Monolayer Graphene*,  
United States Patent, Patent No. US 10,283,871  
Date of Patent: June 4, 2019.

D. Chanda, **M. N Leuenberger**, A. Safaei, S. Chandra,  
*Plasmon-Assisted Photo-thermoelectric Effect-Based Detection of Infrared Radiation on Asymmetrically Patterned Graphene*,  
US Patent App. 62/725,297, 2018.

## Invited Talks

### Defects in transition metal dichalcogenide monolayers

- Seminar, ITIS Foundation, Zurich, Switzerland, April 10, 2019.
- Wyoming Summer School, Casper, Wyoming, USA, July 22-28, 2018, in honor of Lu Sham's 80th Birthday.

### Infrared photodetection based on graphene

- DARPA/MTO Review Meeting, Chicago, USA, October 30, 2017.
- The II-VI Workshop, Chicago, USA, November 1, 2017.

### Electronic and optical properties of transition metal dichalcogenides in the presence of vacancy defects

- EMN West Meeting, Orlando, Switzerland, February 15, 2017.
- Condensed Matter Seminar, *invited by Prof. Daniel Loss*, Department of Physics, University of Basel, Switzerland, September 15, 2016.

### Plasmonically enhanced single-photon emission in monolayer WSe<sub>2</sub>

- Presentation for Airforce Summer Faculty Fellowship, Air Force Research Laboratory, 1864 4th St, Wright-Patterson AFB, OH 45433, July 28, 2016.

### Invitation to be conference moderator

- International Conference on Quantum Physics and Nuclear Engineering, London, United Kingdom, March 14-16, 2016.

### Optical signatures of states bound to vacancy defects in monolayer MoS<sub>2</sub>

- International Conference on Quantum Physics and Nuclear Engineering, London, United Kingdom, March 16, 2016.
- Condensed Matter Seminar, *invited by Prof. Daniel Loss*, Department of Physics, University of Basel, Switzerland, March 10, 2016.
- Condensed Matter Seminar, *invited by Prof. Renbao Liu*, Department of Physics, The Chinese University of Hong Kong, Hong Kong, China, December 17, 2015.
- Condensed Matter Seminar, *invited by Prof. Wang Yao*, Department of Physics, The University of Hong Kong, Hong Kong, China, December 14, 2015.
- EMN Hong Kong Meeting, Graphene Session, Hong Kong, China, December 10, 2015.
- International Conference on Laser Technology, Orlando, USA, July 22, 2015.

### Topological phases and their classifications

- Condensed Matter Seminar, *invited by Prof. Daniel Loss*, Department of Physics, University of Basel, Switzerland, June 20, 2014.

### Majorana fermions

- Condensed Matter Seminar, *invited by Prof. Daniel Loss*, Department of Physics, University of Basel, Switzerland, June 19, 2014.

### **A 3D topological insulator quantum dot for optically controlled quantum memory and quantum computing**

- Deutsche Physikalische Gesellschaft (DPG) German March Meeting, Dresden, Germany, April 4, 2014.

### **Deterministic generation of NOON states using quantum dots in a cavity**

- Condensed Matter Seminar, *invited by Prof. Dirk Englund*, Department of Physics, Columbia University, New York, USA, August 9, 2012.
- Condensed Matter Seminar, Department of Physics, Karlsruhe Institute of Technology, Karlsruhe, Germany, June 27, 2012.

### **The topology of topological insulators**

- Condensed Matter Seminar, *invited by Prof. Dimitrii Maslov*, Department of Physics, University of Florida, Gainesville, USA, October 25, 2011.
- Seminar series, *invited by Prof. Daniel Loss*, Department of Physics, University of Basel, Switzerland, July 18-29, 2011.

### **Entangled photons produced by interactions with quantum wells and quantum dots**

- Condensed Matter Seminar, *invited by Prof. Dirk Englund*, Department of Physics, Columbia University, New York, USA, November 15, 2011.
- Condensed Matter Seminar, *invited by Prof. Dimitrii Maslov*, Department of Physics, University of Florida, Gainesville, USA, October 24, 2011.
- Colloquium, *invited by Prof. Carsten Ullrich*, Department of Physics, University of Missouri, Columbia, October 11, 2010.
- Invited plenary presentation, School and Conference on Spin-based Quantum Information Processing, Konstanz, Germany, August 16-20, 2010.

### **Quantum Network inside a photonic crystal**

- AFOSR review meeting, Hotel Le Meridien-MIT, Cambridge, December 1, 2010.

### **Optical $\Lambda$ transitions and quantum computing in the $^{15}\text{N-V}^-$ Center in Diamond**

- Condensed matter seminar, *invited by Prof. Selim Shahriar*, Department of Physics, Northwestern University, Evanston, October 1, 2009.

### **Entangling photons by means of the nonlinear response of quantum wells**

- Condensed matter seminar, *invited by Prof. Monique Combescot*, NanoInstitute, Université Pierre et Marie Curie, Paris, France, May 13, 2009.
- Condensed matter seminar, *invited by Prof. Xiaoqin Li*, Department of Physics, University of Texas at Austin, October 3, 2008.

### **Teleportation of electronic many-qubit states via single photons**

- Condensed matter seminar, *invited by Prof. Valentin Vlad*, Department of Physics and Astronomy, University of Bucharest, Bucharest, Romania, July 3, 2007.
- Physics colloquium, *invited by Prof. Monique Combescot*, Institut de NanoScience, Université Pierre et Marie Curie, Paris, France, June 28, 2007.
- Condensed matter seminar, *invited by Prof. Anton Zeilinger*, Dept. of Physics and Institute for Quanten Optics and Quantum Information, University of Vienna, Vienna, Austria, June 18, 2007.

- Spintronics seminar, Kavli Institute for Theoretical Physics, University of California Santa Barbara, USA, March 28, 2006. (see <http://online.itp.ucsb.edu/online/spintr06/leuenberger/>)
- Physics colloquium, *invited by Prof. Kyungwha Park*, Department of Physics and Astronomy, Virginia Tech University, USA, October 14, 2005.
- Condensed matter seminar, Department of Physics and Astronomy, University of Central Florida, USA, April 6, 2005.
- Physics colloquium, Department of Physics and Astronomy, University of Kansas, USA, March 8, 2005.
- Physics colloquium, Department of Physics and Astronomy, Vanderbilt University, USA, February 7, 2005.
- Physics colloquium, Department of Physics and Astronomy, University of Iowa, USA, January 24, 2005.
- Condensed matter seminar, Department of Physics, University of California San Diego, USA, October 22, 2004.
- Materials physics/solid state/math physics seminar, Department of Physics and Astronomy, University of Iowa, USA, May 4, 2004.
- Condensed matter seminar, Department of Physics and Astronomy, University of Basel, Switzerland, February 11, 2004.

#### **Berry-phase oscillations of the Kondo effect and Berry-phase blockade in single-molecule magnets**

- Condensed matter seminar, *invited by Prof. Xiaoqin Li*, Department of Physics, University of Texas at Austin, October 2, 2008.
- Condensed matter seminar, *invited by Prof. Renbao Liu*, Department of Physics and Astronomy, Chinese University of Hong Kong, Shatin, August 23, 2007.
- Condensed matter seminar, *invited by Prof. Alexandru Stancu*, Department of Physics and Astronomy, Center for NanoMaterials and NanoTechnology, Iasi, Romania, July 2, 2007.
- Condensed matter seminar, *invited by Prof. Jan von Delft*, Department of Physics and Astronomy, LMU München, Germany, June 21, 2007.
- Condensed matter seminar, *invited by Prof. Markus Büttiker*, Department of Physics and Astronomy, University of Geneva, Switzerland, June 5, 2007.
- Condensed matter seminar, *invited by Prof. Klaus Ensslin*, Department of Physics and Astronomy, ETH Zürich, Switzerland, May 21, 2007.

#### **Superlattice in Graphene**

- Condensed matter seminar, *invited by Prof. Daniel Loss*, Department of Physics and Astronomy, University of Basel, Switzerland, June 12, 2007.

#### **Fault-tolerant quantum computing with spins using the conditional Faraday rotation**

- Condensed matter seminar, Department of Physics and Astronomy, University of Kansas, USA, March 9, 2005.
- Condensed matter seminar, Department of Physics and Astronomy, Vanderbilt University, USA, February 8, 2005.
- Condensed matter seminar, Department of Physics, University of California San Diego, USA, February 2, 2005.
- Materials physics/solid state physics seminar, Department of Physics and Astronomy, University of Iowa, USA, January 25, 2004.

### **Proposal for measuring the entanglement of coupled spins by multiphoton interference**

- Materials physics/solid state seminar, *invited by Prof. Michael Flatté*, Department of Physics and Astronomy, University of Iowa, USA, November 11, 2003.
- Condensed matter seminar, *invited by Prof. Lu Sham*, Department of Physics, University of California San Diego, USA, November 7, 2003.
- Condensed matter seminar, *invited by Dr. Seoungwon Lee*, JPL, California Institute of Technology, Pasadena, USA, November 3, 2003.
- Condensed matter seminar, Department of Physics and Astronomy, University of Basel, Switzerland, August 4, 2003.

### **Quantum information processing with large spins**

- Condensed matter seminar, *invited by Prof. Andy Kent*, Department of Physics, New York University, USA, May 9, 2003.
- Materials physics/solid state seminar, *invited by Prof. Michael Flatté*, Department of Physics and Astronomy, University of Iowa, USA, April 29, 2003.

### **Quantum information processing with large nuclear spins in GaAs semiconductors**

- Condensed matter seminar, *invited by Prof. Lu Sham*, Department of Physics, University of California San Diego, USA, November 5, 2003.
- Condensed matter seminar, Centre for Quantum Computer Technology, Sydney, Australia, July 26, 2002.
- Condensed matter seminar, Department of Physics, Mahidol University, Bangkok, Thailand, July 10, 2002.
- Materials physics/solid state seminar, *invited by Prof. Michael Flatté*, Department of Physics and Astronomy, University of Iowa, USA, April 22, 2002.
- Condensed matter seminar, *invited by Prof. Anthony Leggett*, Department of Physics, University of Illinois at Urbana-Champaign, USA, April 19, 2002.

### **Quantum Computing in Molecular Magnets**

- GdR POMMES, *invited by Prof. Dante Gatteschi*, Journées Thématiques Physique et Chimie des Nanomolécules Magnétiques, Dourdan, France, October 29-30, 2001.
- Condensed matter seminar, *invited by Prof. Jan von Delft*, LMU Fakultät für Physik, München, Germany, June 28, 2001.
- Condensed matter seminar, *invited by Prof. David Awschalom*, Quantum Institute of the UCSB, Santa Barbara, USA, March 27, 2001.

### **Contributed Talks**

#### **Deterministic generation of NOON states using quantum dots in a cavity**

- SPIE Sensing Technology + Applications, Baltimore, MD, USA, May 8, 2014.

#### **Deterministic generation of NOON states using quantum dots in a cavity**

- APS march meeting, Denver, USA, March 3-7, 2014.

#### **Entangling photons by means of the nonlinear response of quantum wells**

- APS march meeting, Pittsburgh, USA, March 16-20, 2009.

#### **Single photon Mach-Zehnder interferometer for quantum networks based on the Single**



### **Photon Faraday Effect: principle and applications**

- APS march meeting, New Orleans, USA, March 10-14, 2008.

### **Berry-phase oscillations of the Kondo effect and Berry-phase blockade in single-molecule magnets**

- APS march meeting, Denver, USA, March 5-9, 2007.

### **Teleportation of electronic many-qubit states via single photons**

- APS march meeting, Los Angeles, USA, March 21-25, 2005.
- PASPS III meeting, Santa Barbara, USA, July 21-23, 2004.

### **Proposal for measuring the entanglement of coupled spins by multiphoton interference**

- APS march meeting, Montreal, Canada, March 22-26, 2004.

### **Quantum information processing with large nuclear spins in GaAs semiconductors**

- Spintech II, Brugge, Belgium, August 4-8, 2003.
- International Conference on Magnetism (ICM 2003), Rome, Italy, July 28 - August 1, 2003.
- MRS spring meeting, San Francisco, CA, USA, April 21-25, 2003.
- APS march meeting, Austin, TX, USA, March 3-7, 2003.

### **Quantum Computing in Molecular Magnets**

- March meeting of the American Physical Society, Indianapolis, USA, March 18-23, 2002.
- Mid-term review meeting of the MolNanoMag network, Dourdan, France, December 13-15, 2001.

### **Incoherent Zener Tunneling and Berry Phase Oscillations in Molecular Magnets**

Mid-term review meeting of the MolNanoMag network, Dourdan, France, December 13-15, 2001.

### **Spin tunneling in molecular magnets,**

Tutorial presentation at the workshop on the theoretical concepts and techniques for spin clusters and single molecule magnets of the MolNanoMag network, Florence, Italy, November 17-19, 2000.

### **Incoherent Zener tunneling and its application to molecular magnets**

International conference on magnetism (ICM2000), Recife, Brazil, August 6-11, 2000.

### **Phonon-assisted and incoherent Zener tunneling of the spin in molecular magnets**

- ESF seminar on molecular magnets, Luebeck, Germany, May 20-23, 2000.
- 18th general conference of the condensed matter division of the European Physical Society, Montreux, Switzerland, March 13-17, 2000.

### **Spin relaxation in Mn<sub>12</sub>-acetate**

1999 Annual Meeting of the Swiss Physical Society, Berne, Switzerland, February 27, 1999.

## **Posters**

### **Deterministic generation of NOON states using quantum dots in a cavity**

Gordon Research Conference on Quantum Science, Stonehill College, Easton, MA, USA, August 12 - 17, 2012.

### **Teleportation of electronic many-qubit states via single photons**

Gordon Research Conference on Quantum Information Science, Ventura, CA, USA, February 27 - March 4, 2005.

### **Measuring the entanglement of coupled spins by multiphoton interference**

DARPA SPINS meeting, Santa Monica, CA, USA, October 13-16, 2003.

### **Quantum information processing with large nuclear spins in GaAs semiconductors**

Gordon Research Conference on Quantum Information Science, Ventura, CA, USA, March 23-28, 2003.

### **Quantum Computing in Molecular Magnets**

- Gordon Research Conference on Magnetic Nanostructures, Il Ciocco, Lucca, Italy, May 12-17, 2002.
- Twannberg Workshop on Nanoscience, Hotel Feriendorf Twannberg, Switzerland, October 16-19, 2001.
- Spintech-I, 1st International Conference and School on Spintronics and Quantum Information Technology, Maui, Hawaii, May 13-18, 2001.

### **Incoherent Zener tunneling and Berry phase oscillations in molecular magnets**

International Workshop on Mesoscopic Physics, Monte Verità, Switzerland, October 8-13, 2000.

### **Spin relaxation in Mn<sub>12</sub>-acetate**

- Swiss-US Nanoforum, ETH Zurich, Switzerland, September 20-21, 1999.
- LT22 Conference, Helsinki University of Technology, Otaniemi, Espoo, Finland, August 4-11, 1999.
- Molecular Clusters, Magnetism and Quantum Size Effects, ESF Workshop, Florence, Italy, November 28-December 1, 1998.
- Magnetism Today, Euroconference, Évora, Portugal, October 4-9, 1998.

## **Advisees**

**PhD students:** Muhammad Waqas Shabbir

**Former group members:** Alireza Safaei (PhD in 2019, postdoc at UIUC), Mahtab Khan (PhD in 2018, Professor in Pakistan), Mikhail Erementchouk (postdoc at University of Michigan), Volodymyr Turkowski (postdoc at UCF), Hari P. Paudel (PhD in 2014, postdoc at Georgia State University, currently researcher at National Energy Tech Lab in Pittsburgh), Sergio Tafur (PhD in 2011, program manager at Naval Research Lab in Washington D.C.), Hubert Seigneur (PhD in 2011, postdoc at FSEC, UCF), Gabriel González (PhD in 2009, faculty member at the Instituto Tecnológico y de Estudios Superiores de Occidente in Guadalajara, Mexico)

## **Teaching experience**

- Dept. of Physics, University of Central Florida, USA:
  - PHY5346 Electrodynamics I: Fall 2018.
  - PHZ6426 Condensed Matter Physics I: Fall 2016, Fall 2017, Fall 2019.
  - PHY6624 Condensed Matter Physics II: Spring 2014, Spring 2015, Spring 2016, Spring 2020.
  - PHZ5405 Condensed Matter Physics I: Fall 2013, Fall 2014, Fall 2015.
  - PHY6624 Quantum Mechanics II: Spring 2013, Spring 2012, Spring 2011, Spring 2010, Spring 2009.
  - PHY5606 Quantum Mechanics I: Fall 2012, Fall 2011, Fall 2010, Fall 2009, Fall 2008.
  - PHY6667 Condensed Matter Quantum Field Theory: Fall 2010.
  - PHY6673 Condensed Matter Quantum Field Theory: Spring 2008.
  - PHY4605 Wave Mechanics II: Spring 2008, Spring 2007.

- PHY4604 Wave Mechanics I: Fall 2007, Fall 2006.
- PHY2049 Physics for scientists and engineers II: Fall 2005.

- Dept. of Physics, University of Kansas, USA:

Lecture on Electrodynamics for undergraduate students, March 9, 2005.

- Dept. of Physics, University of Basel, Switzerland:

- Exercises in Theoretical Electrodynamics: Summer 2001.
- Exercises in Theoretical Mechanics: Winter 2000/01.
- Exercises in Quantum Mechanics II: Summer 2000.
- Course lectures and exercises in Quantum Mechanics I (assisting Prof. D. Loss): Winter 1999/2000.
- Course lectures and exercises in Quantum Mechanics II (assisting Prof. D. Loss): Summer 1999.
- Exercises in Quantum Mechanics I: Winter 1998/99.
- Course lectures on Quantum Mechanics II (assisting Prof. D. Loss): Summer 1998.

## Service

### Continuous service

- Reviews on papers for peer-reviewed journals, such as Phys. Rev. Lett. and Phys. Rev.
- Review on books.
- Yearly panelist for the US National Science Foundation in the divisions ECCS and CBET.
- Yearly proposal reviewer for the US National Science Foundation in the division DMR-CMMT.
- Evaluation of proposals for the European Union and the Deutsche Forschungsgemeinschaft (DFG).

### Organisation and co-organisation of workshops

- Organization of the workshop on "Science and Technology of 2D Materials" in Orlando (August 21-22, 2015), together with Saiful Khondaker (NanoScience Technology Center, UCF), Laurene Tetard (NanoScience Technology Center, UCF), Jayan Thomas (NanoScience Technology Center, UCF), and Abdelkader Kara (Dept. of Physics, UCF).
- Organization of the I<sup>2</sup>Lab workshop "frontiers in quantum and biological information processing" in Orlando (November 16-17, 2006), together with James Hickman (Nanoscience Technology Center, UCF), Eduardo Mucciolo (Dept. of Physics, UCF), Dan Marinescu (Dept. of Electrical Engineering and Computer Science, UCF), and Pawel Wocjan (Dept. of Electrical Engineering and Computer Science, UCF).

## References

- Dr. Daniel Loss, Professor  
Institute of Physics and Astronomy  
University of Basel  
Klingelbergstrasse 82  
CH-4056 Basel, Switzerland  
Phone: +41 (61) 267-3749  
Fax: +41 (61) 267-1349  
E-mail: [Daniel.Loss@unibas.ch](mailto:Daniel.Loss@unibas.ch)
- Dr. Michael E. Flatté, Professor  
IATL 144  
Department of Physics and Astronomy  
University of Iowa  
Iowa City, IA 52242  
USA  
Phone: +1 (319) 335-0201  
Fax: +1 (319) 353-1115  
E-mail: [michael.flatte@mailaps.org](mailto:michael.flatte@mailaps.org)
- Dr. Lu J. Sham, Professor  
Department of Physics  
University of California San Diego  
9500 Gilman Drive  
La Jolla, CA 92093, USA  
Phone: +1 (858) 534-3269  
Fax: +1 (858) 534-2232  
E-mail: [lsham@physics.ucsd.edu](mailto:lsham@physics.ucsd.edu)
- Dr. David D. Awschalom, Professor  
Institute for Molecular Engineering  
University of Chicago  
Chicago, IL 60637, USA  
Phone: +1 (773) 702-7746  
E-mail: [awsch@uchicago.edu](mailto:awsch@uchicago.edu)
- Dr. Pinaki Mazumder, Professor  
Dept. of Electrical Engineering and Computer  
Science  
University of Michigan  
4765 BBB Building  
2260 Hayward Avenue  
Ann Arbor, MI 48109-2121, USA  
Phone: +1 (734) 763-2107  
E-mail: [pinakimazum@gmail.com](mailto:pinakimazum@gmail.com)

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