

Curriculum Vitae

Tomáš Jungwirth

Born: October 23, 1967, Praha, Czech Republic

Home page: <http://www.fzu.cz/~jungw>

Education and professional career:

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| 2007-present | Head of the Department of Spintronics and Nanoelectronics, Institute of Physics, Academy of Sciences of the Czech Republic (ASCR) |
| 2004-present | Professor, University of Nottingham, UK |
| 2001-2007 | Senior Research Scientist, Institute of Physics ASCR |
| 2000-2002 | Research Fellow, University of Texas, USA |
| 1997-1999 | Postdoctoral Fellow, Indiana University, USA |
| 1997 | PhD. degree in condensed matter physics, Charles University, Czech Republic |
| 1991 | M.S. degree in physics, Charles University, Czech Republic |

Professional experience:

condensed matter physics; materials science; many-body phenomena; electronic properties of semiconductor heterostructures, low-dimensional systems, and nanostructures; quantum Hall effects; carrier-mediated ferromagnetism in diluted magnetic semiconductors; magnetic, magneto-transport and magneto-optical properties of ferromagnetic semiconductors; spin-orbit coupling phenomena; anisotropic magnetoresistance in magnetic bulk and nano-devices, anomalous and spin Hall effects, metal and semiconductor spintronics

Accomplishments, awards, and international recognition:

- 150 publications in international peer-reviewed journals (including 23 Physical Review Letters, Reviews of Modern Physics, Science, Nature, Nature Materials, Nature Physics, and Nature Nanotechnology articles); 5200 citations (without self-citations); h-index 37
- European Research Council Advanced Grant 2011
- Member of the Learned Society of the Czech Republic, 2009
- Praemium Academiae, 2008
- Thomson Scientific: In Cites - The Top 3 Hot Papers in Physics: January 2007, March 2007, May 2007; Sci Bytes - Hot Paper in Physics 2006; Essential Science Indicators - 5th most cited author in "The Hall Effect" Special Topic in 1995-2005, Special Topics Interview 2006; ScienceWatch The Hottest Research of 2004-2005 (37th most cited article in all sciences), What's hot in Physics: March/April 2006 (9th most cited in physics), May/June 2006 (9th), July/August 2006 (6th), September/October 2006 (2nd a 8th), January/February 2007 (10th)
- Academy of Sciences of the Czech Republic Prize, 2005
- Otto Wichterle Prize of the Academy of Sciences of the Czech Republic, 2002

- NATO-NSF Advanced Fellowship, 2000
- Bolzano Foundation Prize of the European Physical Society, 1996
- Josef Hlávka Prize, 1996

Patent applications:

1. J. Wunderlich, D. Williams, T. Jungwirth, A. Irvine, B. Gallagher Single-charge tunneling device App. No. EP20060110428, Publ. No. EP1830410, CN101026188, US2007200156, JP2007227879; granted in the U.S. under US7893426
2. J. Wunderlich, C. Chappert, T. Jungwirth, J. Zemen, B. Gallagher, T. Devolder Magnetoresistive device App. No. EP20070112497, Publ. No. EP2015307, KR20090007201, US2009016098, JP2009021586, CN101345079
3. J. Wunderlich, B.-G. Park, A. Shick, T. Jungwirth, F. Mácá Magnetoresistive device App. No. EP20070121701, Publ. No. EP2065886, US2009146232, JP2009130371; granted in the U.S. under US7939870
4. J. Wunderlich, T. Jungwirth, A. Irvine, J. Sinova Spin-polarized charge carrier device App. No. EP20080169560, Publ. No. EP2190022, US2010123133, KR20100056960, JP2010122211

Grants

Czech funding – principle investigator (PI) or co-investigator:

- “Theoretical research in semiconductor spintronics ”, 2005–2007, Grant Agency of the Czech Republic No. 202/05/0575 (PI)
- “Center for nanotechnologies and materials for nanoelectronics”, 2005–2009, Ministry of Education of the Czech Republic No. LC510
- “Collective effects in ferromagnetic semiconductor nanostructures”, 2002–2004, Grant Agency of the Czech Republic No. 202/02/0912 (PI)
- “Low-temperature MBE of ferromagnetic (Ga,Mn)As”, 2004–2006, Grant Agency of the ASCR
- “Magnetotransport in semiconductor nano-superlattices”, 2004–2006, Grant Agency of the ASCR
- “Magnetotransport in bilayer semiconductor structures”, 2001–2003, Grant Agency of the Czech Republic No. 202/01/0754
- “Theory of electronic spectra in quantum wells and heterostructures subjected to magnetic fields”, 1994–1996, Grant Agency of the ASCR No. A110414

USA and EU funding:

- ERC Advanced Grant, “Zero-moment spintronics based on spin-orbit coupling effects, No. 268066 - 0MSPIN, 2011-2016 (PI)

- “Initial Training Network in Nanoscale Semiconductor Spintronics (SemiSpinNet)” 2008-2012, EU FP7 215368-2 (PI)
- “Nanostructured Magnetic Materials for Nano-spintronics (NAMASTE)”, 2008-2011, EU FP7 214499 (PI)
- “Spin coherent transport in quantum nanostructures (SpiCo)”, 2006-2009, EU EUROCORES (PI)
- “Semiconductor Nanospintronics (NANOSPIN)”, 2006–2008, EU FP6 IST-015728-2(PI)
- “Ferromagnetic semiconductors: materials research and spintronic devices”, 2004-2006, EPSRC, UK
- “Theoretical research of ferromagnetic semiconductors” 2002–2004, U.S. Department of Energy Grant No. FG03-02ER45958
- “Mesoscopic Electronics”, 2001–2003, EU – Ministry of Education of the CR COST Program No. OC P5.10
- “Theoretical study of ferromagnetic semiconductors”, 1999-2000, NATO – National Science Foundation, USA (PI)
- “Collective phenomena in bilayer two-dimensional electron systems”, 1996–1998, National Science Foundation, USA – Ministry of Education of the CR Grant No. ME-104

Joint publications with groups from:

Columbia University, USA, Princeton University, USA, California Institute of Technology, USA, Harvard University, USA, University of Notre Dame, USA, University of Buffalo, USA, University of Texas, USA, Texas A&M University, USA, University of California, USA; Yale University, USA, Trent University, Canada, University of Wellington, New Zealand, University of Tokyo, Japan, Osaka University, Tohoku University, Japan, Korea University, South Korea, Scuola Normale Superiore, Italy, University of Regensburg, Germany, University of Wuerzburg, Germany, University of Bochum, Germany; University of Dresden, Germany, University of Nottingham, UK, University of Lancaster, UK, Hitachi Cambridge Laboratory, UK, University of Cambridge, UK, University Paris Sud, France, Academy of Sciences, Poland, etc.

Invited talks at international conferences since 2000:

1. “ Broken-symmetry ground states in bilayer quantum Hall systems”, APS March Meeting, Minneapolis (2000)
2. “Two-dimensional Ising Physics in Quantum Hall Ferromagnets”, XIV International Conference on the Electronic Properties of Two-Dimensional Systems, Prague, Czech Republic (2001)
3. “First Order Phase Transitions in Quantum Hall Ferromagnets”, International Conference on Highly Correlated Systems, Lancaster, UK (2001)

4. “2D Ising physics in quantum Hall ferromagnets”, APS March Meeting, Indianapolis (2002)
5. “Single-layer and bilayer quantum Hall ferromagnets”, German Physical Society Meeting, Regensburg (2002)
6. “Theoretical models of ferromagnetic III-V semiconductors”, COST Meeting, Catania, Italy (2002)
7. “Transport properties of diluted magnetic semiconductor ferromagnets”, International Conference on Nanoelectronics, Lancaster, UK (2003)
8. “Theory of transport in ferromagnetic semiconductors”, International School on the Physics of Semiconducting Compounds, Jaszowiec, Poland (2003)
9. “Magnetic and transport properties of (III,Mn)V ferromagnetic semiconductors”, Joined Magnetism Meetings, Glasgow, UK (2003)
10. “Ferromagnetic III,V semiconductors”, Workshop on Ferromagnetic Semiconductors and Synchrotron Radiation, Daresbury, UK (2003)
11. “Transport and magnetic properties of ferromagnetic (III,Mn)V semiconductors”, Summer School on New Magnetism, Poznan, Poland (2003)
12. “Ferromagnetic Semiconductors: Material Properties and Spintronic Devices”, The Condensed Matter and Material Physics Conference, Warwick, UK (2004)
13. “Magneto-transport in ferromagnetic (III,Mn)V semiconductors”, The 20th General Conference of the Condensed Matter Division of the European Physical Society, Prague, Czech Republic (2004)
14. “Spintronics and ferromagnetic semiconductors”, 27th International Conference on the Physics of Semiconductors, Flagstaff, Arizona (2004)
15. “Spintronics in semiconductors with strong spin-orbit coupling”, Spintronics Workshop, Cambridge, UK (2004)
16. “Spin Hall effect in a two-dimensional hole system”, International Workshop on Spin Phenomena in Reduced Dimension, Regensburg, Germany (2005)
17. “Spin Hall effect”, CECAM Workshop on Anomalous Hall Effect, Lyon, France (2005)
18. “Spin Hall Effect at III-V Semiconductor Interfaces”, 10th International Conference on the Formation of Semiconductor Interfaces, Aix-en-Provence, France (2005)
19. “Spin Hall effect in a two-dimensional hole gas”, 24th International Conference on Low Temperature Physics, Orlando, Florida (2005)
20. “Using spin in future electronic devices”, 6th IUVESTA School on Science and Technology at the Nanoscale, Tri Studne, Czech Republic (2005)

21. "Towards electric-field controlled spintronic devices", Conference on Condensed Matter and Materials Physics, Exeter, UK (2006)
22. "Magnetic ordering and spin-orbit coupling phenomena in Mn-doped zinc-blende semiconductors", International Conference on Magnetism, Kyoto, Japan (2006)
23. "Dilute moment ferromagnetic semiconductors", Spin and Charge Effects at the Nanoscale, Pisa, Italy (2006)
24. "Electric-field controlled spintronic devices", Spin and Charge Effects at the Nanoscale, Pisa, Italy (2006)
25. "Ferromagnetic and non-magnetic spintronic devices based on spin-orbit coupling", III Joint European Magnetic Symposia, San Sebastian, Spain (2006)
26. "Material Issues in Ferromagnetic Semiconductors and AMR Effects in GaMnAs Nanostructures", Kavli Institute for Theoretical Physics: Spintronics, Santa Barbara, USA (2006)
27. "Electric-field controlled spintronic devices", UK Compound Semiconductors, Sheffield, UK (2006)
28. "Spintronic materials and nanodevices", Meeting of the International Union of Pure and Applied Physics, Prague, Czech Republic (2006)
29. "Anisotropic magnetoresistance in ohmic, tunneling, and Coulomb blockade regimes", Workshop on Frontiers in Theoretical Magnetism, Prague, Czech Republic (2006)
30. "Dilute moment ferromagnetic semiconductors for spintronics", Spintronex Meeting, London, UK (2007)
31. "Spin-orbit coupling based spintronics", German Physical Society Meeting, Regensburg, Germany (2007)
32. "Extraordinary magnetotransport in ferromagnetic semiconductors", Workshop of Frontiers in Theoretical Magnetism, Uppsala, Sweden (2007)
33. "Spintronics in ferromagnetic semiconductor (Ga,Mn)As", Moscow International Symposium on Magnetism, Moscow, Russia (2008)
34. "Ferromagnetic semiconductor materials and spintronic transistors", 15th International Conference on Superlattices, Nanostructures, and Nanodevices, Natal, Brazil (2008),
35. "Theoretical concepts for diluted magnetic semiconductors", Summer School Nanomagnetism and Spintronics, Prague, Czech Republic (2008)
36. "Anisotropic magnetoresistance phenomena in ferromagnetic semiconductors and metals", Spintronics Symposium of the SPIE Optics & Photonics Conference, San Diego CA, USA (2008)
37. "Spintronics", 16th Conference of the Czech Physical Society, Hradec Kralove, Czech Republic (2008)

38. “Semiconductor spintronics in ferromagnetic and non-magnetic p-n junctions”, International Workshop on Advances in Spintronic Materials: Theory and Experiment, Duisburg, Germany (2008)
39. “Semiconductor spintronics”, Semiconductor and carbon based nanostructures in magnetic fields, Grenoble, France (2008)
40. “Physics and applications of spintronics”, EuroNanoForum, Prague, Czech Republic (2009)
41. “Anisotropic magnetoresistance and spin-injection Hall effect in 2D spin-orbit coupled systems”, Advanced Workshop: Spin and Charge Properties of Low Dimensional Systems, Sibiu, Romania (2009)
42. “Theory of carrier-controlled ferromagnetic DMS”, Spintech, Cracow, Poland (2009)
43. “Spin-orbit coupling induced magneto-resistance effects in semiconductor nanostructures”, EP2DS-18/MSS-14, Kobe, Japan (2009)
44. “Dilute-moment ferromagnetic semiconductor materials and devices”, E-MRS Fall Meeting, Warsaw, Poland (2009)
45. “Physics and applications of spintronics”, NANOCON 2009, Rožnov pod Radhoštěm, Czech Republic (2009)
46. “From ferromagnetic to non-magnetic semiconductor spintronics: Spin-injection Hall effect”, Workshop of Frontiers in Theoretical Magnetism, Uppsala, Sweden (2009)
47. “Theory of ferromagnetic semiconductor GaMnAs: interpretation of optical spectroscopy measurements”, Meeting on Optical Spintronics of Semiconductors, Cambridge, UK (2009)
48. “Spin-orbit induced magneto-transport effects in (Ga,Mn)As and beyond”, RIEC International Workshop on Spintronics, Sendai, Japan (2010)
49. “Spintronic transistor, 18th Conference of the Slovak Physical Society, Banska Bystrica, Slovakia (2010)
50. “Spintronics based on relativistic phenomena in systems with zero magnetic moment”, 14-th Czech and Slovak Conference on Magnetism (CSMAG’10), Kosice, Slovakia (2010)
51. “Novel Semiconducting Antiferromagnets, Hitachi Cambridge Meeting on Physics for Sustainable Technology, Cambridge, UK (2010)
52. “Beyond ferromagnetic spintronics: antiferromagnetic I-Mn-V semiconductors, Colloquium, Linz, Austria (2010)
53. “Band structure and magneto-transport in (Ga,Mn)As and beyond: I-Mn-V antiferromagnetic semiconductors, International Conference on Superconductivity and Magnetism (ICSM 2010), Antalya, Turkey (2010)

54. “Spintronic transistors”, Millennium Science Forum, Tokyo, Japan (2010)
55. “Spintronics with antiferromagnets”, 5th International Conference on Advanced Materials and Nanotechnology, Wellington, New Zealand (2011)
56. “Physics and applications of spintronics”, Euro Nano Forum, Budapest, Hungary (2011)
57. “Spintronics with antiferromagnets”, Magnetics and Optics Research International Symposium, Nimegen, Netherlands (2011)
58. “Spintronics with antiferromagnetic materials”, International School and Conference on the Physics of Semiconductors, Krynica-Zdroj, Poland (2011)
59. “Antiferromagnetic spintronics” Spintech 6, Matsue, Japan (2011)
60. “Spin Hall and non-local spin valve detection of electrically injected and manipulated spins in a semiconductor”, International Symposium on Advanced Nanodevices and Nanotechnology, Maui, Hawaii USA (2011)