

Curriculum Vitae

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Xudong (Sherman) Fan, Ph.D.

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EDUCATION

- 2000 Ph.D., Physics/Optics, Physics Department, Oregon Center for Optics, Univ. of Oregon
- 1994 M.S., Physics, Peking University, Beijing, P. R. China
- 1991 B.S. Physics, Peking University, Beijing, P. R. China

EMPLOYMENT

- 2010 – present Associate professor, Department of Biomedical Engineering
University of Michigan, Ann Arbor, MI
- 2009 – 12/2009 Associate professor (early promotion), Department of Biological
Engineering
University of Missouri, Columbia, MO
- 2005 – 12/2009 Member of the International Center for Nano/Micro Systems and
Nanotechnology, University of Missouri, Columbia, MO
- 2005 – 12/2009 Adjunct professor, Department of Physics
University of Missouri, Columbia, MO
- 2004 – 12/2009 Member of Christopher S. Bond Life Sciences Center
University of Missouri, Columbia, MO
- 2004 – 2009 Assistant professor, Department of Biological Engineering
University of Missouri, Columbia, MO
- 2000 – 2004 Senior Research Scientist, Project Leader
Corporate Research Laboratory, 3M Corporation, Austin, TX
- 1995 – 2000 Graduate Research Assistant and Teaching Assistant,

Ultrasensitive Biomolecule Detection

Role: PI

Total costs: \$400,000

NSF ECCS 0729903

11/01/2007 – 10/31/2009

Development of highly sensitive ultrafast micro gas chromatography for explosive detection

Role: PI

Total costs: \$400,000

DoD W15QKN-06-R-0742

02/01/2007 - 01/31/2012

Investigation of Advanced Materials and Novel Processing Technology for Potential Use with Department of Defense Weapon Systems

Role: Co-PI (2% shared credits)

Total costs: \$1,210,000

2. PAST FUNDING

Wallace H. Coulter Foundation

08/01/2006 – 10/31/2008

Early career award: Prototyping Lab-on-a-Chip Based on Liquid Core Optical Ring Resonators for Detection of Breast Cancer Biomarkers

Role: PI

Total costs: \$238,000

NIH 5K25EB006011

09/18/2006 – 08/31/2008

Mentored Quantitative Research Career Development Award: Highly Sensitive Biosensor Platform Using Optical Microring Resonators

Role: PI (I am the primary mentor of the mentee, Dr. Ian M. White, in this proposal)

Total costs: \$447,953

American Chemical Society Petroleum Research Fund 43879-G 10 02/01/2006 – 07/31/2008

Single Molecule Raman Detection with a Composite Microresonator and Metal Nanoparticle System

Role: PI

Total costs: \$35,000 (direct cost, no overhead)

Missouri Beef Industry Council

11/01/2007 – 10/31/2008

Rapid Simultaneous Detection of Escherichia coli O157:H7 and Salmonella in Ground Beef by Quantum Dot Labeled Antibodies and Immunomagnetic Separation

Role: Co-PI (shared the same credit as the PI, 50%)

Total costs: \$51,792

NIH 5R21EB5840-3

09/22/2006 – 08/31/2009

Atomic Force-FRET Microscope Using Quantum Dot for Cell Mechanobiology

Role: Co-PI (8% shared credit)

Total costs: \$561,197

- NSF ECCS 0608745 07/01/2006 – 03/31/2008
Functionalized Nanoscale Materials for Sensor Architectures
Role: Co-PI (shared the same credit as the PI, 45%)
Total costs: \$102,392
- DARPA 07/01/2007 – 09/30/2007
Micro-gas-chromatography based on liquid core optical ring resonator
Role: PI
Total costs: \$12,000
- 3M Non-tenured Faculty Award 01/01/2005 – 12/31/2007
Microsphere-based sensor development
Role: PI
Total costs: \$67,500 (direct cost, no overhead)
- MU Research Council 02/01/2006 – 07/31/2006
Multiplexed liquid core optical ring resonator sensors with sub-nanoliter detection volume
Role: PI
Total cost: \$7,500 (direct cost, no overhead)
- NSF 06/01/2006
Major Research Instruments – VPSEM
Role: Co-PI (2% shared credits)
Total costs: \$548,000
- MU College of Engineering 04/01/2006 – 03/31/2007
Equipment Proposal for an Interdisciplinary Modular Undergraduate Laboratory
Role: PI
Total costs: \$18,000 (direct cost, no overhead)
- MU Bioprocessing and Biosensing Center 04/01/2006 – 09/30/2006
Development of fluorescent particle embedded elastic substrates for cell mechanics studies
Role: PI
Total costs: \$11,000 (direct cost, no overhead)
- MU Bioprocessing and Biosensing Center 05/01/2006 – 10/31/2006
Transcytosis of Functionalized Quantum Dots Across the Blood Brain Barrier
Role: Co-PI (10% shared credits)
Total costs: \$10,000 (direct cost, no overhead)
- UM Research Board 01/01/2005 – 12/31/2005
Novel Raman Bio/Chemical Sensor
Role: PI
Total costs: \$27,742 (direct cost, no overhead)
- MU College of Engineering 04/01/2005 – 09/30/2005

Development of Stable Microsphere Resonator Sensors

Role: PI

Total cost: \$23,000 (direct cost, no overhead)

MU Bioprocessing and Biosensing Center

03/01/2005 – 06/30/2005

Fluorescent Semiconductor Quantum Dot Fabrication

Role: PI

Total costs: \$10,000 (direct cost, no overhead)

MU Bioprocessing and Biosensing Center

03/01/2005 – 12/31/2005

Threshold detection of circulating melanoma cells in human blood

Role: Co-PI (15% shared credits)

Total costs: \$11,300 (direct cost, no overhead)

PROFESSIONAL SERVICE

Associate Editor of Optics Express

2008 – present

University of Missouri Doctoral Faculty

2007 – present

Committee Member:

DoD SBIR/STTR	2009
NSF review panel	2007, 2008, 2009 (7 times)
UM Research Board Review Panel	2007
Army Research Office Proposal Review Panel	2006
U.S. Civilian Research and Development Foundation Proposal Review Panel	2006
USDA Multistate Research Coordinating Committee/Information Exchange Group, NCDC201, "Nanotechnology and Biosensors"	2004 – 2007
MU Nanoscience Taskforce	2005
Biological Engineering Department Faculty Search Committee	2006 – 2007
Electrical and Computer Engineering Faculty Search Committee	2005 – 2006

Organizer and Session Chair:

MRS (Materials Research Society)

MRS Annual Meeting, Materials for Optical Sensors in Biomedical Applications

2007-2009

SPIE Defense, Security, and Sensing Symposium, "Photonic Microstructured Sensors"
(organizer and chair, 2008-2009)

2008-2010

SPIE (The International Society for Optical Engineering)

Optics East, Sensors for Harsh Environments

2006 - 2007

SPIE (The International Society for Optical Engineering)

Defense and Security Symposium, Micro (MEMS) and Nanotechnologies for Space Applications 2006 - 2008

SPIE (The International Society for Optical Engineering)
Photonics West, Integrated Optics: Devices, Materials, and Technologies 2007-2008

The 3rd Annual Missouri Nanotechnology Alliance Conference 2006

Ad-hoc reviewer for journals

Journal of Optical Society of America
Sensing and Instrumentation for Food Quality and Safety
Microfluidics and Nanofluidics
Chemical Reviews
Journal of Nanophotonics
Optics Express
Biophysical Journal
Optics Letters
Sensors and Actuators B
IEEE Sensors Journal
Physical Review A
Physical Review B
Applied Physics Letters
Biosensors and Bioelectronics
Analytica Chimica Acta
IEEE Photonics Technology Letters
BMC Biotechnology

HONORS AND AWARDS

Early tenure and promotion (2009)

MU Sigma Xi Excellence in Graduate Research Mentoring Award (2009)

IEEE Sensors Journal Best Paper Award (2008)

Wallace H. Coulter Early Career Award Phase II (2008)

NSF – CAREER Award (2008)

Wallace H. Coulter Early Career Award Phase I (2006)

3M Non-Tenured Faculty Award, 3M Foundation (2006)

American Chemical Society Petroleum Research Award for Junior Faculty (2006)

Non-Tenured Faculty Award, 3M Foundation (2005)

Non-Tenured Faculty Award, 3M Foundation (2004)

Circle of Technical Excellence, 3M Corporation (2004)

3M DISCOVERY Research Grant Award, 3M Corporation (2003)

Circle of Technical Excellence, 3M Corporation (2002)

3M GENESIS Research Grant Award, 3M Corporation (2001)

Travel Grants Award, Division of Laser Science of the American Physical Society (2000)

New Focus Student Travel Grants Award (1999)
Travel Grants Award, Division of Laser Science of the American Physical Society (1999)
Graduate Research Award, Graduate School, University of Oregon (1999)
Travel Grants Award, Division of Laser Science of the American Physical Society (1998)
New Focus Student Travel Grants Award (1997)
Travel Grants Award, Division of Laser Science of the American Physical Society (1997)
Graduate Research Award, Graduate School, University of Oregon (1997)
Highest Honor with the full scholarship award from Peking University (1992 – 1993)
Excellence Award for the academic achievement from Peking University (1992)
Excellence Award for the academic achievement from Peking University (1988)

PROFESSIONAL AFFILIATIONS

Member of Optical Society of America
Member of Institute of Electrical and Electronics Engineers
Member of the International Society of Optical Engineering
Member of American Chemical Society

LIST OF PUBLICATIONS

A. Peer-Reviewed Journal Publications

After joining the University of Missouri (* denotes corresponding author)

58. Hongying Zhu and **Xudong Fan***, "Optofluidic Raman laser," (in preparation)
57. Yuze Sun, Siyka I. Shopova, Chung-Shieh Wu, and **Xudong Fan***, "DNA-based FRET optofluidic lasers," (in preparation).
56. Ian M. White, John Gohring, Paul Dale, and **Xudong Fan***, "Cancer cell detection and analysis with the optofluidic ring resonator (OFRR) biosensors," (in preparation)
55. John Gohring, and **Xudong Fan***, "Optofluidic ring resonator for rapid and label-free detection of CD4+ and HIV virus infected cells (under review)
54. Jonathan D. Suter, Huidong Shi, Charles W. Caldwell, and **Xudong Fan***, "DNA methylation detection using optofluidic ring resonators," (under review)
53. Yuze Sun, Jing Liu, Daniel J. Howard, **Xudong Fan***, Greg Frye-Mason, Shiou-jyh Ja, and Aaron K. Thompson, "Rapid tandem-column micro-gas chromatography based on optofluidic ring resonators with multi-point on-column detection," (accepted by Analyst)

52. Hongying Zhu, Paul S. Dale, Charles W. Caldwell, and **Xudong Fan***, "Rapid and label-free detection of breast cancer biomarker CA15-3 in clinical human serum samples with opto-fluidic ring resonator sensors," (accepted by *Analytical Chemistry*)
51. Chung-Shieh Wu, Jay M. Cupps, and **Xudong Fan***, "Compact Quantum Dot Probes for Rapid and Sensitive DNA Detection Using Fluorescence Resonant Energy Transfer," *Nanotechnology* **20**, 305502 (2009)
50. Xiang Wu, Yuze Sun, and **Xudong Fan***, "Single mode coupled optofluidic ring resonator laser (accepted by *Applied Physics Letters*)
49. Yuze Sun, Jing Liu, Greg Frye-Mason, Shiou-jyh Ja, Aaron K. Thompson, and **Xudong Fan***, "Optofluidic ring resonator sensors for rapid DNT vapor detection," *Analyst* **134**, 1386–1391 (2009)
48. Yuze Sun, Jonathan D. Suter, and **Xudong Fan***, "Robust integrated optofluidic ring resonator dye lasers," *Optics Letters* **34**, 1042-1044 (2009)
47. Jing Liu, Yuze Sun, and **Xudong Fan***, "Highly versatile fiber-based optical Fabry-Pérot gas sensor," *Optics Express* **17**, 2731–2738 (2009)
46. Siyka I. Shopova, Yuze Sun, Albert Rosenberger, and **Xudong Fan***, "Highly sensitive tuning of the resonance of coupled optical ring resonators by microfluidics," *Microfluidics and Nanofluidics* **6**, 425-429 (2009)
45. Yuze Sun and **Xudong Fan***, "Analysis of ring resonators for chemical vapor sensor development," *Optics Express* **16**, 10254-10268 (2008).
44. Jonathan D. Suter, Yuze Sun, Daniel J. Howard, John Viator, and **Xudong Fan***, "PDMS embedded opto-fluidic microring resonator lasers *Optics Express* **16**, 10248-10253 (2008).
43. Hongying Zhu, Ian M. White, Jonathan D. Suter, and **Xudong Fan***, "Phage-based opto-fluidic ring resonator for label-free biomolecule detection," *Biosensors and Bioelectronics* **24**, 461–466 (2008).
42. **Xudong Fan***, Ian M. White, Siyka I. Shopova, Hongying Zhu, Jonathan D. Suter, and Yuze Sun, "Sensitive optical biosensors for unlabeled targets: A review," *Analytica Chimica Acta* **620**, 8-26 (2008).
41. Yuze Sun, Siyka I. Shopova, and **Xudong Fan***, "Rapid chemical vapor sensing using opto-fluidic ring resonators," *Optics Letters* **33**, 788-790 (2008).
40. Gilmo Yang, Ian M. White, **Xudong Fan***, "An opto-fluidic ring resonator biosensor for the detection of organophosphorus pesticides," *Sensors and Actuators B* **133**, 105-112 (2008).
39. Siyka I. Shopova, Ian M. White, Yuze Sun, Hongying Zhu, and **Xudong Fan***, Greg Frye-Mason, Aaron Thompson, and Shiou-jyh Ja, "Rapid on-Column Micro-Gas-Chromatography Detection with Capillary Based Optical Ring Resonators," *Analytical Chemistry* **80**, 2232-2238 (2008).
38. Hongying Zhu, Ian M. White, Jonathan D. Suter, Mohammed Zourob, and **Xudong Fan***, "Opto-fluidic micro-ring resonator for sensitive label-free viral detection," *Analyst* **132**, 356 - 360 (2008).
37. Jonathan D. Suter, Ian M. White, Hongying Zhu, Huidong Shi, Charles W. Caldwell, and **Xudong Fan***, "Label-Free Quantitative DNA Detection using the Liquid Core Optical Ring Resonator," *Biosensors and Bioelectronics* **23**, 1003–1009 (2008).

36. Ian M. White and **Xudong Fan***, "On the performance quantification of resonant refractive index sensors," *Optics Express* **16**, 1020-1028 (2008).
35. Ian M. White, John Gohring, Yuze Sun, Gilmo Yang, Scott Lacey, and **Xudong Fan***, "Versatile waveguide-coupled opto-fluidic devices based on liquid core optical ring resonators," *Applied Physics Letters* **91**, 241104 (2007).
34. Ian M. White, John Gohring, and **Xudong Fan***, "SERS-based detection in an optofluidic ring resonator platform," *Optics Express* **15**, 17433-17442 (2007).
33. Scott Lacey, Ian M. White, Yuze Sun, Siyka I. Shopova, Jay M. Cupps, Po Zhang, and **Xudong Fan***, "Versatile opto-fluidic ring resonator lasers with ultra-low threshold," *Optics Express* **15**, 15523-15530 (2007).
32. Misha Sumetsky*, R. S. Windeler, Y. Dulashko, and **Xudong Fan**, "Optical liquid ring resonator sensor," *Optics Express* **15**, 14376-14381 (2007).
31. Siyka I. Shopova, Jay M. Cupps, Po Zhang, Edward P. Henderson, Scott Lacey, and **Xudong Fan***, "Opto-fluidic ring resonator lasers based on highly efficient resonant energy transfer," *Optics Express* **15**, 12735-12742 (2007).
30. Hongying Zhu, Ian M. White, Jonathan D. Suter, Paul S. Dale, and **Xudong Fan***, "Analysis of biomolecule detection with optofluidic ring resonator sensors," *Optics Express* **15**, 9139-9146 (2007).
29. Siyka I. Shopova, Hongying Zhu, **Xudong Fan***, and Po Zhang, "Optofluidic ring resonator based dye laser," *Applied Physics Letters* **90**, 221101 (2007). (cover feature article and highlighted in July 2007 issue of *Nature Photonics*).
28. Ian M. White, Jonathan D. Suter, Hesam Oveys, **Xudong Fan***, Terry L. Smith, Junying Zhang, Barry J. Koch, and Michael A. Haase, "Universal coupling between metal-clad waveguides and optical ring resonators," *Optics Express* **15**, 646-651 (2007).
27. M. Zourob*, A. Simonian, S. Mohr, **Xudong Fan**, I. Abdulhalim, and N. J. Goddard, "Optical leaky waveguide biosensors for the detection of Organophosphorous pesticides," *Analyst* **132**, 114 - 120 (2007).
26. Hongying Zhu, Ian M. White, Jonathan D. Suter, Mohammed Zourob, and **Xudong Fan***, "An Integrated Refractive Index Optical Ring Resonator Detector for Capillary Electrophoresis," *Analytical Chemistry* **79**, 930-937 (2007).
25. Ian M. White, Hongying Zhu, Jonathan D. Suter, Niranjan M. Hanumegowda, Hesam Oveys, Mohammed Zourob, and **Xudong Fan***, "Refractometric Sensors for Lab-on-a-Chip Based on Optical Ring Resonators," *IEEE Sensors Journal* **7**, 28-35 (2007).
24. Jonathan D. Suter, Ian M. White, Hongying Zhu, and **Xudong Fan***, "Thermal Characterization of Liquid Core Optical Ring Resonator Sensors," *Applied Optics* **46**, 389-396 (2007).
23. Ian M. White, Hesam Oveys, **Xudong Fan***, Terry L. Smith, and Junying Zhang, "Integrated Multiplexed Biosensors Based on Liquid Core Optical Ring Resonators and Anti-Resonant Reflecting Optical Waveguide," *Applied Physics Letters* **89**, 191106-1 - 191106-3 (2006).
22. Hongying Zhu, Jonathan D. Suter, Ian M. White, and **Xudong Fan***, "Aptamer Based Microsphere Biosensor for Thrombin Detection," *Sensors* **6**, 785-795 (2006).

21. Ian M. White, Hesam Oveys, and **Xudong Fan***, "Increasing the Enhancement of SERS with Dielectric Microsphere Resonators," *Spectroscopy*, April Issue (2006). (cover feature article).
20. Ian M. White, Hesam Oveys, and **Xudong Fan***, "Liquid Core Optical Ring Resonator Sensors," *Optics Letters* **31**, 1319-1321 (2006).
19. Niranjana M. Hanumegowda, Ian M. White, and **Xudong Fan***, "Aqueous mercuric ion detection with microsphere optical ring resonator sensors," *Sensors and Actuators B: Chemical* **120**, 207-212 (2006).
18. Ian M. White, Niranjana M. Hanumegowda, and **Xudong Fan***, "Subfemtomole detection of small molecules with microsphere sensors," *Optics Letters* **30**, 3189-3191 (2005).
17. Ian M. White, Niranjana M. Hanumegowda, Hesam Oveys, and **Xudong Fan***, "Tuning whispering gallery modes in optical microspheres with chemical etching," *Optics Express* **13**, 10754-10759 (2005).
16. Niranjana M. Hanumegowda, Caleb J. Stica, Bijal C. Patel, Ian M. White, and **Xudong Fan***, "Refractometric sensors based on microsphere resonators," *Applied Physics Letters* **87**, 201107 (2005).
15. Niranjana M. Hanumegowda, Ian M. White, Hesam Oveys, and **Xudong Fan***, "Label-free protease sensors based on optical microsphere resonators," *Sensor Letters* **3**, 315-319 (2005).

Before joining the University of Missouri

14. **Xudong Fan** and James F. Brennan III, "Performance Effect in Optical-Communication Systems Caused by Phase Ripples of Dispersive Components," *Applied Optics* **43**, 5033-5036 (2004).
13. James F. Brennan III, Michael R. Matthews, William V. Dower, Daniel J. Treadwell, Wei Wang, Jerome Porque, and **Xudong Fan**, "Dispersion correction with a robust fiber," *IEEE Photonics Technology Letters* **15**, 1722 (2003).
12. James M. Battiato, Jerome Porque, David Stegall, and **Xudong Fan**, "Method to balance and stabilize interferometric waveguide devices," *IEEE Photonics Technology Letters* **15**, 419 (2003).
11. **Xudong Fan**, Mark Lonergan, Yuzhong Zhang, and Hailin Wang, "Enhanced spontaneous emission from semiconductor nanocrystals embedded in whispering gallery optical microcavities," *Physical Review B* **64**, 5310 (2001).
10. **Xudong Fan**, Scott Lacey, Phedon Palinginis, Hailin Wang, and Mark Lonergan, "Coupling semiconductor nanocrystals to fused silica microspheres: A quantum-dot microcavity with extremely high Q-factor," *Optics Letters* **25**, 1600 (2000).
9. **Xudong Fan**, Scott Lacey, and Hailin Wang, "Microcavities combining a semiconductor nanostructure with a fused silica microsphere," *Optics Letters* **24**, 771 (1999).
8. **Xudong Fan**, Andrew Doran, and Hailin Wang, "High-Q whispering gallery modes from a composite system of GaAs quantum well and fused silica microsphere," *Applied Physics Letters* **73**, 3190 (1998).

7. **Xudong Fan**, T. Takagahara, J. E. Cunningham, and Hailin Wang, "Pure dephasing induced by exciton-phonon interactions in lower dimensional semiconductors," *Solid State Communications* **108**, 857 (1998).
6. **Xudong Fan**, Hailin Wang, H. Q. Hou, and B. E. Hammons, "Biexcitonic effects in the nonperturbative regime of semiconductor microcavities," *Physical Review B* **57**, Rapid Communications 9451 (1998).
5. **Xudong Fan**, Hailin Wang, H. Q. Hou, and B. E. Hammons, "Laser emission from semiconductor microcavities: transition from nonperturbative to perturbative regimes," *Physical Review B* **56**, 15256 (1997).
4. **Xudong Fan**, Hailin Wang, H. Q. Hou, and B. E. Hammons, "Laser emission from semiconductor microcavities: the role of cavity-polaritons," *Physical Review A* **56**, 3233 (1997).
3. Benyuan Gu and **Xudong Fan**, "Oscillatory magnetoconductance of narrow quantum waveguides in the presence of inhomogeneous magnetic fields," *Zeitschrift fur Physik B* **4**, 527 (1996).
2. **Xudong Fan** and Benyuan Gu, "Quantum percolation and ballistic conductance in a system of double-coupled chains," *ACTA Physica SINICA (Overseas Edition)* **3**, No. X, (1994).
1. **Xudong Fan**, Benyuan Gu, Guozhen Yang, and Tsunghan Lin, "Effects of various obstacles on oscillatory magnetoconductance of quantum double-coupled channels," *Journal of Applied Physics*, **75**, 2466 (1994).

B. Editor-Reviewed Proceedings Publications

After joining the University of Missouri (* denotes corresponding author)

- 49 Paul S. Dale*, John T. Gohring, **Xudong Fan**, "Detection of the Her2/neu protein in serological samples using a novel optofluidic ring resonator biosensor," 5th Annual Academic Surgical Congress, San Antonio, TX (2010)
- 48 Yuze Sun, Jing Liu, Greg Frye-Mason, Aaron Thompson, Shiou-jyh Ja, and **Xudong Fan***, "Novel Two-Dimensional Separation Micro-Gas Chromatography System with Multi-Point On-Column Detection," FACSS, Louisville, KY (2009)
- 47 Jonathan D. Suter, Daniel J. Howard, Huidong Shi, Charles W. Caldwell, and **Xudong Fan***, "Label-Free Analysis of DNA Methylation using Optofluidic Ring Resonators," IEEE EMBS Conference, Minneapolis, MN (2009)
- 46 Hongying Zhu, Paul S. Dale, and **Xudong Fan***, "Optofluidic ring resonator sensor for sensitive label-free detection of breast cancer antigen CA15-3 in human serum," SPIE DSS 2009, Orlando, FL (2009)
- 45 Jonathan D. Suter, Daniel J. Howard, Charles W. Caldwell, Huidong Shi, and Xudong Fan*, "Label-free DNA methylation analysis using the optofluidic ring resonator sensor, SPIE DSS 2009, Orlando, FL (2009)
- 44 John T. Gohring and Xudong Fan*, "Detection of CD4+ and CD8 + T-Lymphocytes with the Optofluidic Ring Resonator (OFRR) Biosensor," SPIE DSS 2009, Orlando, FL (2009)
- 43 Yuze Sun, Jing Liu, Greg Frye-Mason, Aaron Thompson, Shiou-jyh Ja, and **Xudong Fan***, "Development of optofluidic ring resonator based chemical vapor sensing

- platform,” SPIE DSS 2009, Orlando, FL (2009)
42. Yuze Sun, Greg Frye-Mason, Aaron Thompson, Shiou-jyh Ja, and **Xudong Fan***, “Development of optofluidic ring resonator □GC with on-column detection capability,” Pittcon 2009, Chicago IL (2009)
 41. Luxin Wang, Chung-Shieh Wu, **Xudong Fan**, Azlin Mustapha*, Rapid simultaneous detection of *Escherichia coli* O157:H7 and *Salmonella* in ground beef by quantum dot labeled antibodies and immunomagnetic separation, IFT Annual Meeting, Anaheim, CA (2009)
 40. Yuze Sun, Siyka I. Shopova, Ian M. White, Hongying Zhu, Greg Frye-Mason, Shiou-jyh Ja, Aaron Thompson, and **Xudong Fan***, “Rapid chemical vapor sensing and micro gas chromatography detection using optofluidic ring resonators,” MRS Annual Meeting, Boston, MA (2008)
 39. **Xudong Fan***, “Advances in Optical Ring Resonator Based Bio/Chemical Sensing,” The 21st Annual Meeting of The IEEE Lasers & Electro-Optics Society, Newport Beach, CA (2008)
 38. Hongying Zhu, Ian M. White, Chungshieh Wu, Paul S. Dale and **Xudong Fan***, “Label-free breast cancer biomarker detection using opto-fluidic ring resonator biosensor,” BMES annual meeting 2008 at St. Louis, MO (2008)
 37. Ian M. White, John Gohring, Paul Dale, and **Xudong Fan***, “Cancer cell detection and analysis with the optofluidic ring resonator (OFRR) biosensor,” BMES annual meeting 2008 at St. Louis, MO (2008)
 36. Jonathan D. Suter, Yuze Sun, John A. Viator, and **Xudong Fan***, “Integration of optofluidic microring resonator lasers for lab-on-a-chip development,” SPIE Optics and Photonics, San Diego, CA (2008).
 35. Hongying Zhu, Ian M. White, Jonathan D. Suter, and **Xudong Fan***, “Phage-based optofluidic ring resonator for label-free biomolecule detection,” Proc. Laser Applications to Chemical, Security and Environmental Analysis (LACSEA), Florida (2008).
 34. Kenith E. Meissner*, Zhe Sun, Bhavik Nathwani, William N. Everett, **Xudong Fan**, Gerard L. Cote., and Gerald A. Meininger, “Combining AFM and FRET for studies at the cellular level,” SPIE Photonics West, Proc. SPIE 6863, San Jose (2008).
 33. Siyka I. Shopova, Scott Lacey, Ian M. White, Yuze Sun, Hongying Zhu, Po Zhang, and **Xudong Fan***, “Opto-fluidic Ring Resonator Dye Micro-lasers,” SPIE Photonics West, Proc. SPIE 6872, San Jose (2008, invited paper).
 32. Ian M. White, Scott Lacey, John Gohring, Yuze Sun, and **Xudong Fan***, “Development of versatile waveguide-coupled optofluidic microring resonator devices,” SPIE Photonics West, Proc. SPIE 6896, San Jose (2008).
 31. Hongying Zhu, Ian M. White, Jonathan D. Suter, Mohammed Zourob, and **Xudong Fan***, “Miniaturized opto-fluidic ring resonator for sensitive label-free viral detection,” SPIE Photonics West, Proc. SPIE 6896, San Jose (2008).
 30. Ian M. White, Siyka I. Shopova, Hongying Zhu, Jonathan D. Suter, Scott Lacey, Po Zhang, Hesam Oveys, Lee Brewington, John Gohring, and **Xudong Fan***, “Applications of the liquid core optical ring resonator platform,” SPIE Optics East, Proc. SPIE 6757, Boston (2007, invited paper).
 29. Jonathan D. Suter, Ian M. White, Hongying Zhu, Huidong Shi, Charles W. Caldwell, and

- Xudong Fan***, "Label-Free DNA Detection Using Liquid Core Optical Ring Resonators," SPIE Optics East, Proc. SPIE 6757, Boston (2007).
28. Ian M. White, John Gohring, and **Xudong Fan***, "Demonstration of composite signal enhancement from surface enhanced Raman spectroscopy in a liquid core optical ring resonator," Optics East, Proc. SPIE 6759, Boston (2007).
 27. Jay M. Cupps, Darcy Lichlyter, Sheila Grant, and **Xudong Fan***, "Fabrication and characterization of highly stable quantum dots for biosensing applications," Proc. Institute of Biological Engineering Annual Meeting (2007).
 26. Jonathan D. Suter, Ian M. White, Hongying Zhu, Huidong Shi, Charles W. Caldwell, and **Xudong Fan***, "Lab-on-a-chip based on liquid core optical ring resonator for DNA detection," Proc. Institute of Biological Engineering Annual Meeting (2007).
 25. Ian M. White, Jonathan D. Suter, Hongying Zhu, Hesam Oveys, Lee Brewington, John Gohring, and **Xudong Fan***, "Lab-on-a-chip bio/chemical sensing system based on the liquid core optical ring resonator," SPIE Defense and Security Conference, Proc. SPIE 6556, Orlando (2007, invited paper).
 24. Hongying Zhu, Ian M. White, Jonathan D. Suter, Mohammed Zourob, and **Xudong Fan***, "Capillary electrophoresis with liquid core optical ring resonators," Pittcon' 2007, Chicago, IL, 2007
 23. **Xudong Fan***, Ian M. White, Hongying Zhu, Jonathan D. Suter, and Hesam Oveys, "Overview of novel integrated optical ring resonator bio/chemical sensors," SPIE Photonics West, Proc. SPIE 6452 (2007, invited paper).
 22. Ian M. White, Hesam Oveys, **Xudong Fan***, Terry L. Smith, and Junying Zhang, "Demonstration of a liquid core optical ring resonator sensor coupled with an ARROW waveguide array," SPIE Photonics West, Proc. SPIE 6475 (2007).
 21. Jonathan D. Suter, Ian M. White, Hongying Zhu, and **Xudong Fan***, "Thermal Characterization of Liquid Core Optical Ring Resonators," IEEE/LEOS Optical MEMS, Montana (2006).
 20. Hongying Zhu, Ian M. White, Jonathan Suter, Hesam Oveys, and **Xudong Fan***, "Novel label-free method for real-time flow rate monitoring in a capillary based on liquid core optical ring resonators," 33rd FACSS, Orlando (2006).
 19. Ian M. White, Hongying Zhu, Jonathan Suter, Hesam Oveys, **Xudong Fan***, "Liquid core optical ring resonator label-free biosensor array for lab-on-a-chip development," Optics East, Proc. SPIE 6380 (2006).
 18. Ian M. White, Hongying Zhu, Hesam Oveys, and **Xudong Fan***, "Bio/chemical sensors based on liquid core optical ring resonators," SPIE Defense and Security Conference, Proc. SPIE 6223, Orlando (2006).
 17. Ian M. White, Hesam Oveys, and **Xudong Fan***, "Demonstration of Sub-Femtomole Sensitivity for Small Molecules with Microsphere Ring Resonator Sensors," SPIE Photonics West, Proc. SPIE 6092, San Jose (2006).
 16. Niranjana M. Hanumegowda, Ian M. White, and **Xudong Fan***, "Aqueous Mercuric Ion Detection with Microsphere Optical Ring Resonator Sensors," Proc. of American Institute of Chemical Engineers Annual Meeting 2005, 563b (2005).
 15. Niranjana M. Hanumegowda, Caleb J. Stica, Bijal C. Patel, Ian M. White, and **Xudong**

- Fan***, "Refractometric Characterization of Microsphere Resonator Based Optical Sensors," Proc. of IEEE Sensors2005, B3L-A.4, 739-741, Irvine (2005).
14. Ian M. White and **Xudong Fan***, "Demonstration of Composite Microsphere Cavity and Surface Enhanced Raman Spectroscopy for Improved Sensitivity," SPIE Optics East Proc. SPIE 5994, Bostan (2005).
 13. Niranjana M. Hanumegowda, Ian M. White, Caleb J. Stica, Bijal C. Patel, Hesam Oveys, and **Xudong Fan***, "Development of Label-Free Microsphere Optical Resonator Bio/Chemical Sensors," SPIE Optics East, Proc. SPIE 6004 Boston (2005).

Before joining the University of Missouri

12. Eric D. Moore, Mark Frogaatt, **Xudong Fan**, Ding Wang, and Matthews R. Michael, "Impulse response compression for vector characterization of highly dispersive devices," OSA Optical Fiber Communications (OSA, Los Angeles, California, March 2004).
11. **Xudong Fan**, Dwayne L. LaBrake, and James F. Brennan, "Chirped fiber grating characterization with phase ripples," OSA Optical Fiber Communications (OSA, Atlanta, Georgia, March 2003), FC2.
10. **Xudong Fan**, Hailin Wang, and Mark Lonergan, "Probing radiative recombination in semiconductor nanocrystals with cavity QED," APS March Meeting (Minneapolis, Minnesota, March 2000).
9. **Xudong Fan**, and Hailin Wang, "Attaching Nanocrystals to a Dielectric Microsphere: A Quantum Dot Microcavity with Extremely High Q-Factors," CLEO/QELS'99 (Baltimore, Maryland, May 1999) – post-deadline paper.
8. **Xudong Fan**, Scott Lacey, and Hailin Wang, "A quantum-dot microcavity system combining inorganically-capped nanocrystals with high Q dielectric microsphere," OSA Annual Meeting (San Jose, California, September 1999).
7. **Xudong Fan**, Scott Lacey, and Hailin Wang, "High-Q Whispering Gallery Modes from a Combined System of GaAs Quantum Well and Fused Silica Microsphere," CLEO/QELS'99 (Baltimore, Maryland, May 1999).
6. **Xudong Fan**, Hailin Wang, H. Q. Hou, and B. E. Hammons, "Biexcitonic effects in semiconductor Microcavities," CLEO/IQEC'98 (San Francisco, California, May 1998).
5. Hailin Wang, **Xudong Fan**, H. Q. Hou, and B. E. Hammons, "Stimulated emission from GaAs quantum well microcavities: toward laser emission from a few excitons," Proceedings of SPIE, 3283, 221 (1998).
4. Hailin Wang, **Xudong Fan**, H. Q. Hou, and B. E. Hammons, Laser emission from semiconductor microcavities: transition from nonperturbative to perturbative regimes, CLEO/IQEC'98 (San Francisco, California, May 1998).
3. Hailin Wang, **Xudong Fan**, H. Q. Hou, and B. E. Hammons, "Pure dephasing induced by exciton-phonon interactions in GaAs quantum dots," CLEO/IQEC'98 (San Francisco, California, May 1998).
2. **Xudong Fan**, Hailin Wang, H. Q. Hou, and B. E. Hammons, "Laser emission from semiconductor microcavities: transition from nonperturbative to perturbative regimes," OSA Annual Meeting (Long Beach, California, October 1997).
1. **Xudong Fan**, Hailin Wang, H. Q. Hou, and B. E. Hammons, "Stimulated emission from semiconductor microcavities," CLEO/QELS'97 (Baltimore, Maryland, May 1997).

C. Book Chapters

9. Jonathan D. Suter and **Xudong Fan***, "Optofluidic ring resonators" in *Handbook on Optofluidics*, Editor Aaron Hawkins and Holger Schmidt, CRC Press (forthcoming)
8. Hongying Zhu, Jonathan D. Suter, and **Xudong Fan***, "Ring Resonator bio/chemical sensors," Editor M. Zourob, Springer (2009).
7. *Advanced Photonic Structures for Biological and Chemical Sensing*, Editor, **Xudong Fan**, Springer (2009).
6. Yuze Sun and **Xudong Fan***, "Opto-fluidic ring resonators for chemical sensing", in *Advanced Photonic Structures for Biological and Chemical Sensing*, Editor, **Xudong Fan**, Springer (2009).
5. Siyka I. Shopova and **Xudong Fan***, "Microfluidic lasers based on opto-fluidic ring resonators", in *Advanced Photonic Structures for Biological and Chemical Sensing*, Editor, **Xudong Fan**, Springer (2009).
4. Ian M. White and **Xudong Fan***, "Opto-fluidic ring resonator for label-free biosensors", in *Advanced Photonic Structures for Biological and Chemical Sensing*, Editor, **Xudong Fan**, Springer (2009).
3. **Xudong Fan***, Ian M. White, Siyka Shopova, Hongying Zhu, Jonathan D. Suter, Yuze Sun, and Gilmo Yang, "Optofluidic Ring Resonator Biological and Chemical Sensors" in *Practical applications of microresonators in optics and photonics*, Editor, Andrey Matsko, Taylors and Francis.
2. Mohammed Zourob*, Souna Elwary, **Xudong Fan**, "Resonant Mirror Biosensor" in *Methods in Biotechnology*, Biosensors and Biodetection: Methods and Protocols Volume 1: Optical-Based Detectors (Methods in Molecular Biology), Editor, Avraham Rasooly and Keith E. Herold, Humana Press.
1. Ian M. White, Hongying Zhu, Jonathan D. Suter, **Xudong Fan***, Mohammed Zourob, "Label-free detection with the liquid core optical ring resonator sensing platform" Biosensors and Biodetection: Methods and Protocols Volume 1: Optical-Based Detectors (Methods in Molecular Biology), Editor, Avraham Rasooly and Keith E. Herold, Humana Press.

D. Invited Presentations

26. EUROPT(R)ODE X (Prague, Czech, March 2010)
25. University of Oregon (Feb. 2010)
24. SPIE Photonics West (San Francisco, CA, January 2010)
23. IEEE Engineering in Medicine and Biology 2009 (October 2009)
22. NSF Fiber sensing workshop (Wuhan, China, July 2009)
21. Optofluidic ring resonators for sensitive label-free bioanalytical detection, Pittcon'2009, Chicago, IL (March 2009)
20. BME Department, Drexel University (March 2009)

19. BME Department, University of Michigan (February 2009)
18. AIMBE Annual Meeting (February 2009)
17. A universal label-free biosensing platform based on opto-fluidic ring resonators, SPIE Photonics West, San Jose, CA (January 2009).
16. ECE Department, UIUC (Jan. 2009)
15. Vanderbilt University (Jan. 2009)
14. Northeastern University (October, 2008)
12. University of Minnesota (October, 2008)
11. Advances in optical ring resonator based bio/chemical sensing, The 21st Annual Meeting of The IEEE Lasers & Electro-Optics Society, Newport Beach, CA (2008).
10. New York Polytech. (May, 2008)
9. Opto-fluidic Ring Resonator Dye Micro-lasers, SPIE Photonics West (2008)
8. Applications of the liquid core optical ring resonator platform, SPIE Optics East (2007)
7. Optofluidic ring resonators: properties, characterization, and applications, CRI Workshop on the "Physics of Microresonators" University of North Carolina at Charlotte (2007)
6. Novel Optical Ring Resonators for Label-free Biodetection, Mid-South Annual Engineering & Sciences Conference (2007)
5. Lab-on-a-chip bio/chemical sensing system based on the liquid core optical ring resonator, SPIE Defense and Security Conference at Orlando FL (2007)
4. Overview of novel integrated optical ring resonator bio/chemical sensors, SPIE, Photonics West, San Jose (2007)
3. Bio-chemical sensor development based on liquid core optical ring resonators, University of Georgia (2006)
2. Nonlinear optical interactions in semiconductor microcavities in the nonperturbative regime, OSA Annul Meeting (Baltimore, Maryland, October 1998)
1. Stimulated emission from semiconductor microcavities: Toward laser emission from a few excitons, Physics and Simulation of Optoelectronic Devices VI (1998)

E. Patents (unpublished one are not disclosed)

8. "Hollow Core Optical Ring Resonator Sensor, Sensing Methods, and Methods of Fabrication," 20070237460.
7. "Method of coupling light into microresonators," 20070230870.
6. "Hybrid sphere-waveguide resonators" 20050077513.
5. "Dielectric microcavity sensors," 20050265658.
4. "Porous microsphere resonators," 7,259,855.
3. "Systems and methods for biosensing and microresonator sensors for same," 7,257,279.
2. "Dielectric microcavity fluorosensors excited with a broadband light source," 7,271,379.
1. "Quality review method for optical components using a fast system performance characterization," 6,781,698.

APPENDIX A DETAILED LIST OF CLASSES TAUGHT

BE 4670/7670 Photonics and nanotechnologies in optical biosensors (formerly known as BE 4001/7001): W05, F06, F07, F08

In this course, latest applications of photonics and nanotechnologies in optical bio/chemical sensors will be reviewed. By the end of the course, undergraduate students will be familiar with the state-of-art of what is going on in the forefront of optical biosensor areas. Graduate students will understand the underlying models and be able to do simple calculations.

BE 8270 Principles and Applications of Fluorescence: W06, W07, W08

This course will provide

1. in-depth discussion on physical and chemical processes related to fluorescence
2. detailed discussion on fluorescence characterization
3. related instrument and their components
4. time domain and spectral domain
5. discussion on non-linear optical phenomena
6. examples of applications of fluorescence in bioengineering, sensors (chemical, biological), and Imaging

BE 8087 Graduate student seminar: F05

This course is intended to (1) improve scientific oral communication skills; and (2) Improve scientific literature comprehension skills. The format of this class is discussion and oral presentation; therefore, class participation is mandatory. This class will be divided into two sections. During the first section the class will work as a journal club, students will give a short seminar on current literature followed by a class discussion. The second section of the class will be longer scientific oral presentations.

BE 4280 Survey of Bioengineering Techniques: F08

This course will cover 5-6 topics, including Bioelectricity, Bioenvironment, Biomaterials, Biophotonics, Bioprocessing, and Biomechatronics. Over ten faculty members from Biological Engineering Department, Mechanical Engineering Department, Electrical & Computer Engineering Department, and Chemical Engineering Department are involved in developing this course. This 3-credit course is intended for senior students and has a 4-hour lab and 1-hour lecture each week. The course is plan to open in the fall semester of 2007 and will be able to accommodate 27 students during its first offer. Our collaborative effect has been strongly encouraged and supported by the chairs of BE, ECE, MAE, and ChemE. In addition, we have applied for and awarded \$18,000 of "Undergraduate Course Enhancement" funding from the College of Engineering.

**APPENDIX B
ACADEMIC ADVISING (AS A PRIMARY MENTOR)**

() denotes female or minority*

Visiting Scholars

Professor Scott Lacey (Franklin & Marshall College)	2007
Professor Po Zhang (Linn State Technical College)	2007 – 2008
Dr. Gilmo Yang (National Institute of Agricultural Engineering, South Korea)	2007 – 2008
Professor Xiang Wu (Fudan University, China)	2009
Professor Xiaoyun Pu (Yunnan University, China)	2009

Post-doctoral Fellows

Dr. Ian M. White (NIH Post-doctor Fellow, Ph.D. from Stanford)	2005 – present
(Dr. White is now an assistant professor at the University of Maryland at College Park)	
Dr. Siyka Shopova* (Ph.D. from Oklahoma State University)	2007 – present

Ph.D. Students

Jonathan D. Suter (NIH Biodetective Fellow)	2005 – present
Hongying Zhu*	2005 – present
Yuze Sun*	2007 – present
Chung-Shieh Wu	2008 – present
Jing Liu*	2008 – present
Daniel Howard	2009 – present
Hao Li	2009 – present

Master Students

Niranjan M. Hanumegowda	Graduated in 2005
Jay M. Cupps	2007 - present
Luxin Wang*	2007 - present
John Gohring	2008 - 2009

Undergraduate Students

Paul Whiteside	2009 - present
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Daniel J. Howard	2007 - 2009
Juri Bassuner	2007 - 2009
John Gohring	2006 – 2008
Chelsea A. Luebbert*	2006 – 2007
Erika Muckerman*	2007
Hesam Oveys	2005 – 2007
Lee Brewington	2006 – 2007
Alana Leah Anne Rugen*	2005 – 2006
Jay M. Cupps	2005 – 2006
Eren Gultepe	2005
Bijal Patel*	2005
Adam Donz	2005
Jeffrey LaCroix	2005
Ryan Curtis Beehler-Evans	2006
Caleb J. Stica	2005 – 2006

Capstone Design Group (Kathy Brown, Joseph Gitersonke, and Emily Spradling) 2007

High School Students

Dmiter Shopov (Rockbridge High School)	2007 -present
Samuel Roland (Rockbridge High School)	2007–present
Nina Lai* (Hickman High School)	2007
Boair Qin* (Hickman High School)	2007
Albert Lwin (Hickman High School)	2005 – 2007
Shafi Lodhi (Rockbridge High School)	2008
Helen Lin (Hicman High School)	2008–present

ACADEMIC ADVISING (AS COMMITTEE MEMBER)

Luxin Wang (Ph.D., Food Sciences)
 Ya Guo (Ph.D., BE)
 Craig R Weilbaecher (Ph.D., BE)
 Richard Stringer (M.S., BE, graduated in 2007)
 Yen Fong Chan (M.S., ChemE, graduated in 2006)

Anupam Radhakrishnan (M.S., MAE, graduated in 2007)

Bhavin Ramesh Patel (M.S., MAE, graduated in 2007)

Venumadhav R Korampally (Ph.D., ECE, graduated in 2007)

Majed El-Dweik (Ph.D., BE)

Rosalynn Monique Manor (Ph.D., BE, graduated in 2007)

Shantanu Bhattacharya (Ph.D., BE, graduated in 2006)

APPENDIX C COLLABORATORS

- On-campus: Profs. Sheila Grant and John Viator (Bio. Eng.); Prof. Shubhra Gangopadhyay (Electrical Eng.); Profs. JK Chen, Qingsong Yu, and Hao Li (Mech. Eng.); Profs. William Caldwell and Huidong Shi (Dept. Pathology, Cancer Research Center); Prof. Gerald Meininger (Dalton Cardiovascular Center); Drs. Paul Dale, Klaus Thaler, and Edward Sauter (Dept. Surgery); Prof. Azlin Mastapha (Dept. Food Sciences).
- Other universities and institutes: University of Missouri – Rolla: Prof. Hai-Lung Tsai and Prof. Hai Xiao; Texas A&M: Prof. Kenneth Meissner; Lincoln University: Prof. Sunder Balasubramanian; Tianjin University (China): Profs. Feng Gao and Huijuan Zhao; Ben Gurion University of the Negev (Israel): Prof. Ibrahim Abdulhalim; Fudan University (China): Prof. Lei Xu and Xiang Wu; National Institute of Agricultural Engineering (South Korea): Dr. Gilmo Yang.
- Industrial companies: 3M: Drs. Terry L. Smith and Chunmei Guo; Biophage Pharma, Inc. (Canada): Dr. Mohammed Zourob; ICx Nomadics: Dr. Greg Frye-Mason; Honeywell: Dr. Alex Freeman; CreatvMicroTech: Dr. Cha-Mei Tang; OFS Laboratories: Drs. Misha Sumetsky and David DiGiovanni; Invitrogen: Dr. Yu-zhong Zhang; Intelligent Optical Systems; Dr. Glenn Bastiaans; GE: Dr. Radislav Potyrailo; Midwest Research Institute: Dr. Robert Barton