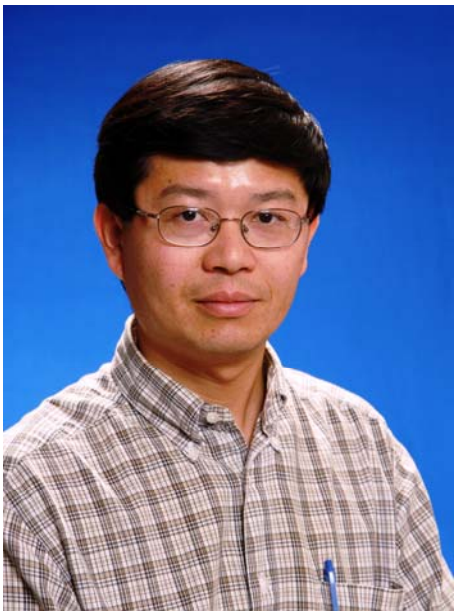

Rui Q. Yang

Education
PhD, Solid State Physics
Nanjing University, China, 1987
MS, Solid State Physics
Nanjing University, China, 1984
BS, Physics
Zhejiang University, China, 1982

Experience
Professor
University of Oklahoma
Principal/Senior Member of
Engineering Staff, Task Manager
Jet Propulsion Laboratory,
California Institute of
Technology, Pasadena, CA

RESEARCH INTERESTS

Semiconductor quantum structures and devices, applied and engineering physics, optoelectronics and applications, mid-infrared lasers and detectors, photovoltaic devices for energy conversion, particularly thermophotovoltaic (TPV) cells for conversion of mid-infrared light.

BIOGRAPHY

Dr. Yang is a professor in the School of Electrical and Computer Engineering at the University of Oklahoma. He is the inventor of interband cascade (IC) lasers, detectors, and photovoltaic devices with research activities ranging from condensed matter physics to semiconductor quantum devices such as tunneling diodes, mid-infrared lasers and detectors, and photovoltaic devices for converting infrared light to electricity. Prior to joining the University of Oklahoma in 2007, he was a Principal Member of Engineering Staff and a Task Manager at the Jet Propulsion Laboratory (JPL), California Institute of Technology, Pasadena, California, where he led the development of advanced mid-infrared interband cascade lasers for applications in Earth sciences and planetary explorations. He received the Edward Stone Award in 2007 from JPL for outstanding research publication and the successful accelerated infusion of cutting-edge interband cascade semiconductor laser technology into flight mission readiness. The laser that he invented and developed with his colleagues at JPL has been selected for NASA flight mission and landed with Curiosity on Mars. He has authored/co-authored more than 110 refereed journal articles and two book chapters with 4 patents and over 200 conference contributions, invited seminars, and talks. He has been the principal investigator on many tasks and contracts from NASA, DoD, DoE funding agencies, and NSF.

AWARDS, HONORS AND PROFESSIONAL ACTIVITIES

Fellow: IEEE, OSA.
Edward Stone Award in 2007 from JPL.
Best Technical Section Paper Award at 22nd Army Science Conference (Baltimore, 2000)

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SELECTED PROJECTS

NSF, "Quantum Engineered Long-Wavelength Infrared Photodetectors", 06/01/2012-05/31/2015

AFOSR, "Low-noise Mid-wavelength IR Photodetectors", 06/01/2012-11/30/2013

NSF MRI, "Acquisition of a Molecular Beam Epitaxy Chamber for Quantum-Engineered Structures and Devices", (with Michael B. Santos (PI) *et al*.) 08/01/2012 – 07/31/2014

Department of Energy EPSCoR program, "Interband cascade photovoltaic cells", 07/01/2010-06/30/2014

National Science Foundation (NSF), "Energy-efficient interband cascade lasers", 06/01/2010-05/30/2013

Air Force Office of Scientific Research, "Low Noise Interband Cascade Photodetectors," 05/2009-11/2011

SELECTED PUBLICATIONS

"Theory of Multiple-Stage Interband Photovoltaic Devices and Ultimate Performance Limit Comparison of Multiple-Stage and Single-Stage Interband Infrared Detectors", J. Appl. Phys. **114**, 104506, 2013 (with R. T. Hinkey).

"Narrow-Bandgap Photovoltaic Devices Operating at Room Temperature and Above with High Open-Circuit Voltage", Appl. Phys. Lett, **102**, 211103, 2013 (with H. Lotfi, *et al.*)

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"Interband Cascade Photovoltaic Devices for Conversion of Mid-IR Radiation", IEEE J. Photovoltaics, **3**, 745 , 2013 (with R. T. Hinkey, *et al*.).

"Single-waveguide dual-wavelength interband cascade lasers", Appl. Phys. Lett. **101**, 171118, 2012 (with L. Li, *et al*.)

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"InAs-based interband cascade lasers near 5.3 μm", IEEE J. Quantum Electron **48**, 915, 2012 (with Z. Tian, *et al*.).

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"Thermoelectrically cooled interband cascade laser for field measurements", *Optical Engineering*, **49**, article 111119, 2010 (with L. E. Christensen, K. Mansour).

"Interband cascade photovoltaic devices", *Appl. Phys. Lett*. **96**, No. 6, article 063504, 2010 (with Z. Tian, J. F. Klem, T. D. Mishima, M. B. Santos, and M. B. Johnson).

"Plasmon-Waveguide Interband Cascade Lasers Near 7.5 μm", *Photonics Technol. Lett*. **21**, p. 1588, 2009 (with Z. Tian, T. D. Mishima, M. B. Santos, and M. B. Johnson).

"InAs-based interband cascade lasers near 6 μm," *Electronics Letters*, **45**, p. 48, 2009 (with Z. Tain, *et al*.).

"Distributed feedback mid-infrared interband cascade lasers at thermoelectric cooler temperatures," *IEEE J. Selected Topics of Quantum Electronics*, **13**, p. 1074, 2007 (with C. J. Hill, *et al*.).

"Optical gain, loss and transparency current in high performance mid-IR interband cascade lasers", *J. Appl. Phys.* **101**, article 093104, 2007 (with A. Soibel, K. Mansour, Y. Qiu, C. J. Hill).

"Mid-IR interband cascade lasers at thermoelectric cooler temperatures", *Electronics Letters*, **42**, p. 1034, 2006 (with K. Mansour, Y. Qiu, C. J. Hill, A. Soibel).

"MBE Growth Optimization of Sb-Based Interband Cascade Lasers", *J. Crystal Growth* **278**, p. 167, 2005 (with C. J. Hill).

"Novel Concepts and Structures for Infrared Lasers," Chap. 2, in Long Wavelength Infrared Emitters Based on Quantum Wells and Superlattices, edited by M. Helm (Gordon & Breach Pub., Singapore, 2000).

杨瑞青 (YANG, Rui Qing) - 1982 年获得浙江大学物理学学士学位，1984 年和 1987 年先后获得南京大学物理学硕士和博士学位。1987 年曾与他人共同获得中国国家自然科学奖(四等)。博士毕业后在中国科技大学物理系从事科研工作。1990 年至 1994 年，在加拿大多伦多大学从事半导体量子结构和器件的研究。其间，他提出了带间级联激光器的概念。1995 年于美国休斯顿大学任研究科学家，并担任红外激光器项目领导。1997 年，升为研究副教授，并转为器件物理和模拟项目领导。1999 年转到美国陆军实验室工作。2000 年担任某公司首席技术总监(CTO)，负责公司的技术研究和发展。2001 年到美国加州理工喷气推进实验室(JPL)任资深工程师，负责中红外半导体激光器的研发工作。他随后升任主要 (Principal) 工程师和项目经理，并在 2007 年被授予爱德华·斯通奖 (Edward Stone Award), 以表彰其杰出的研究贡献，特别是成功地促进带间级联激光器前沿技术在火星探测计划中的应用。他于 2007 年到美国俄克拉荷马大学 (University of Oklahoma) 电子工程系任教授，主要从事半导体物理和器件的教学和研发。

杨瑞青博士从事的科研领域跨越凝聚态物理到实际的量子器件及应用，他（或与人合作）在同行评审的期刊上发表论文 110 余篇，撰写专著中的二章，获专利 4 项，并多次受邀在学术会议和讲座上发表专题报告。他在半导体量子结构和器件方面的工作得到世界上广泛的引用，并获得美国多项研究基金的支持。他最有影响的成就是在带间级联激光器方面的开创性工作和随后持续的发展。他发明和领导开发的中红外带间级联激光器，已被应用到许多分子的探测，并被选用在美国航天署火星探测计划“好奇号”的仪器中。其他方面的贡献包括：发展了量子阱子带间光跃迁的理论；首次提出和发展了带间级联红外探测器及相关的理论；首次提出和证实了带间级联光伏器件；首次在世界上实验验证带间隧穿二极管电流峰谷比在室温超过 100；首次提出量子实空间转移机理和实现的方案。他在 2013 年当选国际电子电气工程师学会会士 (IEEE Fellow) 和光学学会会士 (OSA Fellow).