

SETH ROBERT BANK

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RESEARCH INTERESTS

Developing novel solid-state hetero- and nano-structures for integrated (opto)electronic devices and sensors

CITIZENSHIP

United States of America

EDUCATION

Stanford University (9/00 – 4/06)

Doctor of Philosophy in Electrical Engineering, 4/6/06

Thesis: *High-Performance 1.55- μ m GaAs-Based Dilute-Nitride Lasers*

Master of Science in Electrical Engineering, 7/03

University of Illinois at Urbana-Champaign (8/95 – 8/00)

Bachelor of Science in Electrical Engineering, 8/99

Coursework Pursuant to Master of Science in Electrical Engineering

EXPERIENCE

The University of Texas, Austin, TX

Temple Foundation Faculty Fellowship No. 5 (9/12 – Present)

Associate Professor – Department of Electrical and Computer Engineering (9/12 – Present)

Assistant Professor – Department of Electrical and Computer Engineering (1/07 – 9/12)

- Device applications and synthesis of solid-state hetero- and nano-structures
 - Low noise III-V avalanche detectors
 - First realization of staircase avalanche photodetector
 - First demonstration of low noise from AlInAsSb materials
 - First low-noise III-V avalanche photodetector operating at 1.55 μ m
 - Highest gain low noise InAs avalanche photodiodes
 - Epitaxial plasmonic materials and designer metals
 - Record III-V active Si doping of InAs, shifting plasmon resonance into mid-IR
 - First demonstration of compositional tuning of plasmonic properties (e.g. LaLuGdAs)
 - First demonstration of plasmonic response from rare earth monpnictides (e.g. ErAs)
 - Band-anticrossed semiconductors (e.g. dilute-nitride mid-IR lasers and detectors)
 - Longest wavelength GaSb-based diode laser with GaSb barriers
 - Demonstrations of high-quality, droplet-free InAsBi alloys
 - High-efficiency tunnel junctions employing semimetallic nanostructures
 - Enhanced tunneling currents by >225x over previous state-of-the-art
 - Successfully transferred technology to Solar Junction Corp.
 - First application to semiconductor lasers
 - Semiconductor/metal nanocomposites (e.g. THz generation/sensing and thermoelectrics)
- Built state-of-the-art molecular beam epitaxial (MBE) growth facility largely through extramural funding and equipment donations
- Teaching:
 - Introduction to Electrical and Computer Engineering (undergrad) – F'2011, 2012, 2014-2016
 - Revised lecture and lab components (w/Ed Yu)
 - Semiconductor Optoelectronic Devices (graduate) – Sp'2007-2013, 2015
 - Lasers and Optical Engineering (undergrad/grad) – Fall 2007, 2008, 2009, 2010, Sp'2016

University of California, Santa Barbara, CA (2/06 – 12/06)

Postdoctoral Scholar – Departments of Materials and Electrical and Computer Engineering

Supervisors – **Professors Arthur Gossard and Mark Rodwell**

CURRICULUM VITAE – SETH ROBERT BANK

- MBE growth and application of semiconductor/metal nanocomposites
 - Semimetallic nanoparticles (e.g. ErAs) embedded in semiconductors
 - Applications to HBTs, tunnel junctions, and THz generation/detection
 - Electrically injected erbium-oxygen light emitters on silicon
- MBE growth of high-mobility channel materials for SRC Center on Si-based III-V MOSFETs
- Teaching:
 - Characterization of Electronic Materials – Co-developed and taught new graduate course

Stanford University, Stanford, CA (9/00 – 1/06)

Graduate Research Assistant – Solid State and Photonics Laboratory

Advisor – **Professor James Harris**

- MBE growth and fabrication of GaAs-based lasers from 1.3 to 1.55 μm
 - Demonstrated first continuous-wave (cw) 1.45–1.55 μm lasers grown on GaAs
 - Holds all GaAs-based laser performance records emitting $>1.4 \mu\text{m}$
 - Improved MBE growth of GaInNAs and GaInNAsSb films on GaAs
 - Co-enhanced luminescence efficiency ~ 10 fold and reduced linewidth $>25\%$
 - Contributed to understanding of basic physical properties and growth kinetics
 - Developed new metric for evaluating laser active regions
 - Investigated physics governing temperature stability of lasers
 - Growth of GaInNAsSb on InP for sensing applications $>2.0 \mu\text{m}$
 - Growth of 1.55 μm absorption samples with strong and well-defined excitonic features
- External collaborations on novel GaAs-based device structures
 - First GaAs-based distributed feedback laser at 1.5 μm (w/Forchel at Würzburg)
 - GaInNAs-based avalanche photodiodes (w/Campbell at UT-Austin)
 - Modelocked lasers at 1.55 μm (w/Lester at U-New Mexico)
 - Hybrid MBE/MOCVD buried heterostructure lasers at 1.55 μm (w/Sumitomo)
- Preparation of AlGaAs/GaAs quantum wells for spin injection experiments (w/Parkin at IBM)
- Investigated luminescence mechanisms of boron implanted silicon (w/Patel at SLAC)

University of Illinois, Urbana, IL (6/00 – 8/00)

Teaching Assistant – ECE 344 Silicon IC Fabrication Laboratory

- Fabrication of MOSFETs and BJTs in silicon
- Taught one lab section, graded papers, wrote quizzes, maintained lab
- Students in section received seven of the nine A's awarded over three sections (~30 students total)

University of Illinois, Urbana, IL (5/99 – 8/00)

Graduate Research Assistant – Semiconductor Research Group

Advisors – **Professors Gregory Stillman and Kuang-Chien Hsieh**

- Fabrication and testing of dc and microwave InGaP/GaAs and InGaAs/InP HBTs
- Characterization of PIN photodetectors integrated into standard HBT process for smart pixel arrays

HONORS AND AWARDS

- (Supervisor) Electronic Materials Conference (EMC) Student Paper Award (2016)
- (Supervisor) Electronic Materials Conference (EMC) Student Paper Award (2014)
- (Supervisor) Device Research Conference (DRC) Student Paper Award (2013)
- (Supervisor) Ben Streetman Research Prize (2013)
- (Supervisor) Electronic Materials Conference (EMC) Student Paper Award (2012)
- (Supervisor) Ben Streetman Research Prize (2012)
- High Gain Award from the ECE Department at UT-Austin (2010)
- Kavli Fellow (2010)
- ONR Young Investigator Program (YIP) (2010)
- NSF Faculty Early Career Development (CAREER) Program (2010)
- AFOSR Young Investigator Program (YIP) (2009)

CURRICULUM VITAE – SETH ROBERT BANK

- Presidential Early Career Award for Scientists and Engineers (PECASE) (2009)
- Young Scientist Award from the International Conf. on Compound Semiconductors (ISCS) (2009)
- ARO Young Investigator Program (YIP) (2008) – *superseded by PECASE*
- Young Investigator Award from North American Conf. on Molecular Beam Epitaxy (NAMBE) (2008)
- DARPA Young Faculty Award (YFA) (2008)
- The Rank Prize Funds Dilute-Nitride Mini-Symposium – Best Contributed Paper Award (2006)
- North American Conference on Molecular Beam Epitaxy (NAMBE) Student Paper Award (2005)
- Ross N. Tucker Award – Contributions to electronic materials (Stanford/UC-Berkeley, 2005)
- Electronic Materials Conference (EMC) Student Paper Award (2004)
- Gerald L. Pearson Graduate Fellowship – Fellowship in solid-state electronics (Stanford, 2000)
- John Bardeen Scholarship – Achievement and research potential in physical electronics (UIUC, 1999)

PROFESSIONAL SOCIETIES AND ACTIVITIES

- General Chair:
 - 2016 IEEE Device Research Conference (DRC) – General Chair
 - 2016 IEEE/OSA Conference on Lasers and Electro Optics (CLEO) – S&I General Co-chair
- Program Chair:
 - 2015 IEEE Device Research Conference (DRC) – Program Chair
 - 2014 IEEE/OSA Conference on Lasers and Electro Optics (CLEO) – S&I Program Co-chair
 - 2014 IEEE Device Research Conference (DRC) – Technical Vice-Chair
 - 2010 North American Conference on MBE (NAMBE) – Program Chair
- Subcommittee Chair:
 - 2013 IEEE/OSA Conference on Lasers and Electro Optics (CLEO) – Semiconductor Lasers
 - 2013 IEEE Photonics Annual Meeting (IPC2013) – Photonic Materials and Metamaterials (PMM)
 - 2012 IEEE/OSA Conference on Lasers and Electro Optics (CLEO) – Semiconductor Lasers
 - 2012 IEEE Photonics Annual Meeting (IPC2012) – Photonic Materials Science and Technology (PMST) (Vice Chair)
 - 2011 International Conference on Indium Phosphide and Related Materials (IPRM) – Bulk Materials and Epitaxy
- Program Committees:
 - IEEE International Electron Devices Meeting (IEDM) (2015 – Present)
 - North American Conference on MBE (NAMBE) (2012, 2016)
 - Device Research Conference (DRC) (2011, 2012, 2013)
 - Electronic Materials Conference (EMC) – Epitaxial Materials (2009 – Present)
 - IEEE/OSA Conference on Lasers and Electro Optics (CLEO) – Semiconductor Lasers (2009, 2010, 2011, 2012, 2013)
 - IEEE Photonics Society Annual Meeting (IEEE IPC) – Photonic Materials and Metamaterials (PMM) (2008, 2009, 2010, 2011, 2012, 2014, 2015, 2016)
 - Formerly Lasers and Electro-Optics Society (LEOS)
 - Photonics Asia – Optoelectronic Devices and Integration (2010)
- Special Symposia:
 - Co-organizer of 50th Anniversary of the Semiconductor Laser Symposium, CLEO 2012
 - Co-organizer of Joint Symposium on Hybrid Quantum Nanoplasmonic Systems, CLEO 2011
- Other Conference Organization Duties:
 - CLEO Steering Committee (IEEE Representative) (2016-Present)
 - EMC Recording Secretary (2015-2016)
 - NAMBE Fundraising Chair (2010, 2011, 2012, 2013) – coordinated AFOSR/ONR support
 - DRC Fundraising (2014, 2015) – coordinated (w/MRS) NSF/MRS/IBM/Teledyne support
 - DRC Rump Session Co-Organizer – Next 50 Years: What's After the Transistor? (2013)
 - DRC Rump Session Co-Organizer – III-V Compound semiconductors on Si: "A happy marriage" or "Keep your filthy materials out of my fab"? (2012)
- Recent Workshops/Summits:
 - Northrop Grumman New Semiconductors and Devices Workshop (2014)
 - 4th International Workshop on Bismuth Containing Semiconductors (July 2013)

CURRICULUM VITAE – SETH ROBERT BANK

- Stanford University Photonics Research (SUPR) Career panel participant (April 2012)
- Army Research Office Electronics Strategy Meeting (Nov. 2011)
- National Academy of Sciences (NAS) “22nd Annual Kavli Frontiers of Science” (Nov. 2010)
- National Academy of Engineering (NAE) “2010 US Frontiers in Engineering Symposium” (Sept. 2010)
- Professional Society Committees:
 - IEEE Representative to CLEO Steering Committee (2016-Present)
 - IEEE Photonics Society representative to IEEE Nanotechnology Council (2014, 2015)
 - IEEE Photonics Society Technical Affairs Council (2013, 2014, 2015, 2016)
- Journal Reviewer: Applied Physics Letters, J. of Applied Physics, Nano Letters, Optics Letters, Optics Express, IEEE Photonics Technology Letters, IEEE Journal of Quantum Electronics, Electronics Letters, J. of Lightwave Technology, J. of Crystal Growth, Semiconductor Science and Technology, Scientific Reports, Nature Photonics
- Panels: NSF DMR Panel (2016), NSF SBIR (2016), NSF CAREER Panel (2015), NSF SBIR Panel (2015), NSF EPMD Panel (2014), NSF DMR Panel (2013), NSF EPMD Panel (2012), NSF DMR Review Panel (2012), NSF CAREER Review Panel (2011), NSF EPMD Panel (2010), NSF EPMD Panel (2009), NSF EPMD Panel (2008), NSF Graduate Research Fellowship Review (2008)
- Proposal Reviewer: Air Force Office of Scientific Research (AFOSR), Army Research Office (ARO), Department of Energy (DOE), National Science Foundation (NSF)
- Member: Senior Member of IEEE (SM’11, M’06, S’95), MRS, Eta Kappa Nu, Tau Beta Pi
- Outreach: Eta Kappa Nu: Fireside host (2007, 2008, 2010, 2011), Smoker (2008, 2009, 2010), Tech Area Night (2007, 2010, 2011, 2012, 2014x2), Women in Engineering Lunch with an Engineer (2008, 2009), Women in Engineering Dinner with an Engineer (2008), IGERT Summer Nanoscience Academy (2011), Austin Children’s Museum: Tours of the Microelectronics Research Center (2010, 2011, 2012, 2013), Science Thursday’s at Bullock History Museum (2015), NSF/SPIE/OSA International Year of Light Family Science Fun Event (2015), NSF/ECCS Broader Impacts Workshop (2016).

ADMINISTRATIVE SERVICE

- ECE Curriculum Reform Committee (2015 *ad hoc*; 2016 formal)
- ECE Faculty Recruiting Committee (2014 – 2016)
- (Chair) ECE Future Directions Subcommittee (2014)
- ECE Nanofabrication Facility Planning Committee (2013 – Present)
- ECE Joint Bsc/Msc Degree and Honors Track Committee (2013 – 2014)
- Faculty Council (2011 – 2013)
- Faculty Expectations Committee (2011 – 2013)
- Parking and Traffic Appeals Panel (2011 – 2013)
- ECE Committee for EERC Building (2010 – 2013)
- ECE Major Sequence Appeals Committee (2010 – Present)
- Solid-State Electronics Faculty Search Committee (2007, 2008, 2009)
 - Successfully hired two chaired and one junior faculty
- Undergraduate Curriculum Reform Committee (2008)
- Unified Qualifying Procedure Committee (2008)

CONSULTING

- VecturaLux, Austin, TX (6/11 – Present)
 - Co-founder
 - Member of Scientific Advisory Board (6/11 – Present)
- Exxon Mobile, Houston, TX (9/09 – Present)
- Solar Junction Corporation, San Jose, CA (7/07 – Present)
 - Member of Technical Advisory Board (8/07 – 4/09)
- TT electronics / OPTEK Technology, Carrollton, TX (10/07 – 8/08)
- EpiWorks, Champaign, IL (8/00 – 9/00)

PUBLICATION LIST (>200 total, >3000 citations, Hirsch Index = 30)¹

Recent Invited Seminars and Workshops

1. **S.R. Bank**, “New Materials for Photonics in the Mid-Infrared: From Lasers and Detectors to Plasmonics and Metamaterials,” *ECE Colloquium Lehigh University*, March 2016, Philadelphia, PA.
2. **S.R. Bank**, “Recent progress in high gain InAs- and GaSb-based avalanche photodiodes (APDs),” *Seminar at Army Night Vision Lab*, Oct 2015, Fort Belvoir, VA.
3. **S.R. Bank**, “Mid-infrared photonic devices and materials,” *University of Pennsylvania Seminar*, July 2015, Philadelphia, PA.
4. **S.R. Bank**, “New Materials for Photonics in the Mid-Infrared: From Lasers and Detectors to Plasmonics and Metamaterials,” *University of Illinois at Urbana-Champaign NanoEP Graduate Seminar*, April 2014, Urbana, IL.
5. **S.R. Bank**, “Epitaxy of terahertz, plasmonic and infrared devices,” *2014 Lawrence Symposium of Epitaxy*, 2014 Lawrence Symposium on Epitaxy, Scottsdale, AZ, Feb. 2014.
6. **S.R. Bank**, “Terahertz Materials,” *CATS Workshop at Rice University*, Oct. 2013, Houston, TX.
7. **S.R. Bank**, “Recent Advances in InAs Avalanche Photodiodes,” *2013 IEEE Photonics Society Conference (IPC)*, Bellevue, WA, Sept. 2013.
8. **S.R. Bank**, E.M. Krivoy, and S.J. Maddox, “Growth of epitaxial doped semiconductor and semimetallic plasmonic materials,” *SPIE Optics and Photonics Meeting*, San Diego, Ca, Aug. 2013.
9. **S. R. Bank**, “Plasmonics with Crystalline Semiconductors and Semimetals: Opportunities to Mitigate Loss and Add Functionality,” *UC Berkeley SINAM Seminar*, Oct 2013, Berkeley, CA.
10. **S. R. Bank**, “New Materials for Photonics in the Mid-Infrared: From Lasers and Detectors to Plasmonics and Metamaterials,” *Stanford Univ. Applied Physics Electronics and Photonics Seminar*, Oct 2013, Stanford, CA.
11. **S. R. Bank**, S. J. Maddox, A. P. Vasudev, V. D. Dasika, M. L. Brongersma, “InAs(Bi): Bismuth as a Surfactant and Lattice Constituent for Photodetectors and Plasmonics,” *4th International Workshop on Bismuth Containing Semiconductors*, July 2013, Fayetteville, AR.
12. **S.R. Bank**, “Reengineering THz Photomixers at the Materials and Device Levels,” *Air Force Research Laboratory Seminar*, Nov. 2012, San Antonio, TX.
13. **S.R. Bank**, “LuAs Films and Nanostructures,” *Embedded Nanoparticle Workshop*, June 2011, Santa Barbara, CA.
14. **S.R. Bank**, “Harnessing the Electrical, Optical, and Structural Properties of Metal:Semiconductor Nanocomposites for Device Applications,” *Notre Dame Solid State Seminar (S3)*, Feb. 2011, South Bend, IN.
15. **S.R. Bank**, “Epitaxial Metal:Semiconductor Nanocomposites (Harnessing Their Electrical, Optical, and Structural Properties),” *22nd Annual Kavli Frontiers of Science Symposium*, Nov. 2010, Irvine, CA.
16. **S.R. Bank**, “Harnessing the Electrical, Optical, and Structural Properties of Metal:Semiconductor Nanocomposites for Device Applications,” *Stanford Univ. EE Seminar*, April 2010, Stanford, CA.
17. **S.R. Bank**, “Applications of Epitaxial Nanostructures to Nanophotonics,” *Yale University Seminar*, April 2010, New Haven, CT.
18. **S.R. Bank**, E.T. Yu, A. Alu, S.K. Banerjee, B. Korgel, “Metamaterials-Based Integration of Photovoltaics Into Displays,” *Intel Workshop on Multifunctional Photovoltaic Systems*, Feb. 2010, Santa Clara, CA.
19. **S.R. Bank**, “Potential Applications of Metallic Nanostructures for Electronic Devices,” *Office of Naval Research Electronic Materials Frontier Workshop*, Jan. 2010, Washington, DC.
20. **S.R. Bank**, “Enhancing Photonic Devices with Metallic Nanostructures,” *University of Illinois at Urbana-Champaign Graduate Seminar*, April 2009, Urbana, IL.

Submitted Peer-Reviewed Journal Publications

1. D. Jung, J. Faucher, S. Mukherjee, A. Akey, D.J. Ironside, M. Cabral, J. Lebeau, **S.R. Bank**, T. Buonassisi, O. Moutanabbir, and M.L. Lee, “Highly tensile-strained Ge/InAlAs nanocomposites,” *submitted*, Feb. 2016.

Peer-Reviewed Journal Publications

¹ Google Scholar profile from 05/01/2016.

1. K. Chen, M.N. Yogeesh, Y. Huang, S. Zhang, F. He, X. Meng, S. Fang, N.T. Sheehan, T.H. Tao, **S.R. Bank**, J. Lin, D. Akinwande, P. Sutter, T. Lai, and Y. Wang, "[Non-destructive measurement of photoexcited carrier transport in graphene with ultrafast grating imaging technique](#)," *Carbon*, vol. 107, pp. 233–239, Oct. 2016.
2. Z. Wu, W. Li, M.N. Yogeesh, S. Jung, A.L. Lee, K. McNicholas, A. Briggs, **S.R. Bank**, M.A. Belkin, D. Akinwande, and Y. Zheng, "[Tunable Graphene Metasurfaces with Gradient Features by Self-Assembly-Based Moire Nanosphere Lithography](#)," *Advanced Optical Materials*, Aug. 2016.
3. S.J. Maddox, S.D. March, and **S.R. Bank**, "[Broadly Tunable AllInAsSb Digital Alloys Grown on GaSb](#)," *ACS Crystal Growth & Design*, vol. 16, no. 7, pp. 3582–3586, June 2016.
4. M. Ren, S.J. Maddox, M.E. Woodson, Y. Chen, **S.R. Bank**, and J.C. Campbell, "[AllInAsSb separate absorption, charge, and multiplication avalanche photodiodes](#)," *Applied Physics Letters*, vol. 108, no. 19, pp. 191108, May 2016.
5. R. Salas, S. Guchhait, K.M. McNicholas, S.D. Sifferman, V.D. Dasika, D. Jung, E.M. Krivoy, M.L. Lee, and **S.R. Bank**, "[Surfactant-assisted growth and properties of rare-earth arsenide InGaAs nanocomposites for terahertz generation](#)," *Appl. Phys. Lett.*, vol. 108, no. 18, pp. 182102, May 2016.
6. H.R. Seren, J. Zhang, G.R. Keiser, S.J. Maddox, X. Zhao, K. Fan, **S.R. Bank**, X. Zhang, and R.D. Averitt, "[Nonlinear terahertz devices utilizing semiconducting plasmonic metamaterials](#)," *Light: Science & Applications*, vol. 5, no. 5, pp. e16078, May 2016.
7. C.S. Schulze, X. Huang, C. Prohl, V. Fullert, S. Rybank, S.J. Maddox, S.D. March, **S.R. Bank**, M.L. Lee, and A. Lenz, "[Atomic structure and stoichiometry of In\(Ga\)As/GaAs quantum dots grown on an exact-oriented GaP/Si\(001\) substrate](#)," *Appl. Phys. Lett.*, vol. 108, no. 14, pp. 143101, Apr. 2016.
8. *(Invited)* S.J. Maddox, M. Ren, M.E. Woodson, **S.R. Bank**, and J.C. Campbell, "[Recent progress in avalanche photodiodes for sensing in the IR spectrum](#)," *Proc. SPIE*, vol. 9854, pp. 985405–985405–6, Apr. 2016.
9. M. Ren, S.J. Maddox, Y. Chen, M. Woodson, J.C. Campbell, and **S.R. Bank**, "[AllInAsSb/GaSb staircase avalanche photodiode](#)," *Appl. Phys. Lett.*, vol. 108, no. 8, pp. 081101, Feb. 2016.
10. M.E. Woodson, M. Ren, S.J. Maddox, Y. Chen, **S.R. Bank**, and J.C. Campbell, "[Low-noise AllInAsSb avalanche photodiode](#)," *Appl. Phys. Lett.*, vol. 108, no. 8, pp. 081102, Feb. 2016.
11. N.T. Yardimci, R. Salas, E.M. Krivoy, H.P. Nair, **S.R. Bank**, and M. Jarrahi, "[Impact of substrate characteristics on performance of large area plasmonic photoconductive emitters](#)," *OSA Optics Express*, vol. 23, no. 25, pp. 32035–32043, Dec. 2015.
12. *(Invited)* S.D. Sifferman, H.P. Nair, R. Salas, N.T. Sheehan, S.J. Maddox, A.M. Crook, and **S.R. Bank**, "[Highly strained mid-infrared type-I diode lasers on GaSb](#)," *IEEE J. Sel. Top. Quantum Electron.*, vol. 21, no. 6, pp. 1–10, Nov. 2015.
13. K.W. Park, E.M. Krivoy, H.P. Nair, **S.R. Bank**, and E.T. Yu, "[Cross-sectional scanning thermal microscopy of ErAs/GaAs superlattices grown by molecular beam epitaxy](#)," *Nanotechnology*, vol. 26, no. 26, pp. 265701, July 2015.
14. R. Salas, S. Guchhait, S.D. Sifferman, K.M. McNicholas, V.D. Dasika, E.M. Krivoy, D. Jung, M.L. Lee, and **S.R. Bank**, "[Growth and properties of rare-earth arsenide InGaAs nanocomposites for terahertz generation](#)," *Appl. Phys. Lett.*, vol. 106, no. 8, pp. 081103, 2015.
15. V.D. Dasika, E.M. Krivoy, H.P. Nair, S.J. Maddox, K.W. Park, D. Jung, M.L. Lee, E.T. Yu, and **S.R. Bank**, "[Increased InAs Quantum Dot Size and Density using Bismuth as a Surfactant](#)," *Appl. Phys. Lett.*, vol. 105, no. 25, pp. 253104, Dec. 2014.
16. X. Li, V.D. Dasika, P. Li, L. Ji, **S.R. Bank**, and E.T. Yu, "[Minimized open-circuit voltage reduction in GaAs/InGaAs quantum well solar cells with bandgap-engineered graded quantum well depths](#)," *Appl. Phys. Lett.*, vol. 105, no. 12, pp. 123906, Sept. 2014.
17. M. Wagner, A.S. McLeod, S.J. Maddox, Z. Fei, M. Liu, R.D. Averitt, M.M. Fogler, **S.R. Bank**, F. Keilmann, and D.N. Basov, "[Ultrafast Dynamics of Surface Plasmons in InAs by Time-Resolved Infrared Nanospectroscopy](#)," *Nano Lett.*, vol. 14, no. 8, pp. 4529, Aug. 2014.
18. K. Appaiah, S. Vishwanath, and **S.R. Bank**, "[Impact of fiber core diameter on dispersion and multiplexing in multimode-fiber links](#)," *OSA Optics Express*, vol. 22, no. 14, pp. 17158–17171, July 2014.
19. K. Appaiah, S. Zisman, A.K. Das, S. Vishwanath, and **S.R. Bank**, "[Analysis of Laser and Detector Placement in Incoherent MIMO Multimode Fiber Systems](#)," *IEEE J. Opt. Commun. Netw.*, vol. 6, no. 4, pp. 1, Apr. 2014.

20. K. Appaiah, R. Salas, S. Vishwanath, and **S.R. Bank**, "[Offset Coupling, Feedback, and Spatial Multiplexing in \$4 \times 4\$ Incoherent-MIMO Multimode Fiber Links](#)," *IEEE/OSA J. Lightw. Technol.*, vol. 31, no. 17, pp. 2926–2939, Aug. 2013.
21. S. Rahimi, E.M. Krivoy, J. Lee, M.E. Michael, **S.R. Bank**, and D. Akinwande, "[Temperature dependence of the electrical resistivity of LaLuAs](#)," *AIP Advances*, vol. 3, no. 8, pp. 082102, July 2013.
22. K. Appaiah, S. Vishwanath, and **S.R. Bank**, "[Vector Intensity-Modulation and Channel State Feedback for Multimode Fiber Optic Links](#)," *IEEE Trans. Commun.*, vol. 61, no. 7, pp. 2958–2969, July 2013.
23. K.W. Park, H.P. Nair, A.M. Crook, **S.R. Bank**, and E.T. Yu, "[Quantitative scanning thermal microscopy of ErAs/GaAs superlattice structures grown by molecular beam epitaxy](#)," *Appl. Phys. Lett.*, vol. 102, no. 6, pp. 061912, Feb. 2013.
24. W. Sun, Z. Lu, X. Zheng, J.C. Campbell, S.J. Maddox, H.P. Nair, and **S.R. Bank**, "[High-Gain InAs Avalanche Photodiodes](#)," *IEEE J. of Quantum Electron.*, vol. 49, no. 2, pp. 154, Feb. 2013.
25. R. Kudrawiec, H.P. Nair, M. Latkowska, K. Misiewicz, **S.R. Bank**, and W. Walukiewicz, "[Contactless electroreflectance study of Fermi level pinning on GaSb surface in n-type and p-type GaSb Van Hoof structures](#)," *J. Appl. Phys.*, vol. 112, pp. 123513, Dec. 2012.
26. E.M. Krivoy, S. Rahimi, H.P. Nair, R. Salas, S.J. Maddox, D.J. Ironside, Y. Jiang, G. Kelp, G. Shvets, D. Akinwande, and **S.R. Bank**, "[Growth and characterization of single crystal rocksalt LaAs using LuAs barrier layers](#)," *Appl. Phys. Lett.*, vol. 101, no. 22, pp. 221908, Nov. 2012.
27. A. Majumdar, A. Rundquist, M. Bajcsy, V.D. Dasika, **S.R. Bank**, and J. Vuckovic, "[Design and analysis of photonic crystal coupled cavity arrays for quantum simulation](#)," *Phys. Rev. B*, vol. 86, pp. 195312, Nov. 2012.
28. E.M. Krivoy, H.P. Nair, A.M. Crook, S. Rahimi, S.J. Maddox, R. Salas, D.A. Ferrer, V.D. Dasika, D. Akinwande, and **S.R. Bank**, "[Growth and characterization of LuAs films and nanostructures](#)," *Appl. Phys. Lett.*, vol. 101, no. 14, pp. 141910, Oct. 2012.
29. S.J. Maddox, W. Sun, Z. Lu, H.P. Nair, J.C. Campbell, and **S.R. Bank**, "[Enhanced Low-Noise Gain from InAs Avalanche Photodiodes with Reduced Dark Current and Background Doping](#)," *Appl. Phys. Lett.*, vol. 101, no. 15, pp. 151124, Oct. 2012.
30. K.W. Park, V.D. Dasika, H.P. Nair, A.M. Crook, **S.R. Bank**, and E.T. Yu, "[Conductivity and structure of ErAs nanoparticles embedded in GaAs pn junctions analyzed via conductive atomic force microscopy](#)," *Appl. Phys. Lett.*, vol. 100, no. 23, pp. 233117, June 2012.
31. H.P. Nair, A.M. Crook, K.M. Yu, and **S.R. Bank**, "[Structural and optical studies of nitrogen incorporation into GaSb-based GaInSb quantum wells](#)," *Appl. Phys. Lett.*, vol. 100, no. 2, pp. 021103, Jan. 2012.
32. (*Invited*) K. Appaiah, S. Vishwanath, and **S.R. Bank**, "[Device Design and Signal Processing for Multiple-Input Multiple-Output Multimode Fiber Links](#)," *Proc. of SPIE*, vol. 8267, pp. 826715, Jan. 2012.
33. K. Appaiah, S. Vishwanath, and **S. Bank**, "[Advanced Modulation and Multiple-Input Multiple-Output for Multimode Fiber Links](#)," *IEEE Photonics Technol. Lett.*, no. 99, pp. 1–3, Sept. 2011.
34. K.W. Park, H.P. Nair, A.M. Crook, **S.R. Bank**, and E.T. Yu, "[Scanning capacitance microscopy of ErAs nanoparticles embedded in GaAs pn junctions](#)," *Appl. Phys. Lett.*, vol. 99, pp. 133114, Sept. 2011.
35. A. Sciambi, M. Pelliccione, M.P. Lilly, **S.R. Bank**, A.C. Gossard, L.N. Pfeiffer, K.W. West, D. Goldhaber-Gordon, K. Deguchi, and Y. Mizuguchi, "[Vertical Field-Effect Transistor Based on Wavefunction Extension](#)," *Phys. Rev. B*, vol. 84, no. 8, pp. 085301, Aug. 2011.
36. A.M. Crook, H.P. Nair, D.A. Ferrer, and **S.R. Bank**, "[Suppression of planar defects in the molecular beam epitaxy of GaAs/ErAs/GaAs heterostructures](#)," *Appl. Phys. Lett.*, vol. 99, pp. 072120, Aug. 2011.
37. A.M. Crook, H.P. Nair, and **S.R. Bank**, "[Surface segregation effects of erbium in GaAs growth and their implications for optical devices containing ErAs nanostructures](#)," *Appl. Phys. Lett.*, vol. 98, no. 12, pp. 121108, Apr. 2011.
38. A. Hosseini, D. Kwong, Y. Zhang, S.A. Chandorkar, F. Crnogorac, A. Carlson, B. Fallah, **S. Bank**, E. Tutuc, J. Rogers, R.F.W. Pease, and R.T. Chen, "[On the fabrication of three-dimensional silicon-on-insulator based optical phased array for agile and large angle laser beam steering systems](#)," *J. Vac. Sci. Technol. B*, vol. 28, no. 6, pp. C6O1–C6O7, Nov. 2010.
39. A. Sciambi, M. Pelliccione, **S.R. Bank**, A.C. Gossard, and D. Goldhaber-Gordon, "[Virtual scanning tunneling microscopy: A local spectroscopic probe of two-dimensional electron systems](#)," *Appl. Phys. Lett.*, vol. 97, no. 13, pp. 132103, Sept. 2010.
40. A.M. Crook, H.P. Nair, and **S.R. Bank**, "[High-performance nanoparticle-enhanced tunnel junctions for photonic devices](#)," *Physica Status Solidi (c)*, vol. 7, no. 10, pp. 2544–2547, June 2010.

41. H.P. Nair, A.M. Crook, and **S.R. Bank**, "[Enhanced conductivity of tunnel junctions employing semimetallic nanoparticles through variation in growth temperature and deposition](#)," *Appl. Phys. Lett.*, vol. 96, no. 22, pp. 222104, May 2010.
42. Y. Chen, Y. Zhao, A. Hosseini, D. Kwong, W. Jiang, **S.R. Bank**, E. Tutuc, and R.T. Chen, "[Delay-Time-Enhanced Flat-Band Photonic Crystal Waveguides with Capsule-Shaped Holes on Silicon Nanomembrane](#)," *IEEE J. Sel. Topics Quantum Electron.*, vol. 15, no. 5, pp. 1510–1514, Sept. 2009.
43. A.M. Mintairov, K. Sun, J.L. Merz, H. Yuen, **S.R. Bank**, M. Wistey, J.S. Harris, G. Peake, A. Egorov, V. Ustinov, R. Kudrawiec, and J. Misiewicz, "[Atomic arrangement and emission properties of GaAs\(In, Sb\)N quantum wells](#)," *Semic. Sci. Technol.*, vol. 24, no. 7, pp. 075013, July 2009.
44. G.J. Burek, M.A. Wistey, U. Singiseti, A. Nelson, B.J. Thibeault, **S.R. Bank**, M.J.W. Rodwell, and A.C. Gossard, "[Height-selective etching for regrowth of self-aligned contacts using MBE](#)," *J. Cryst. Growth*, vol. 311, no. 7, pp. 1984–1987, Mar. 2009.
45. U. Singiseti, J.D. Zimmerman, M.A. Wistey, J. Cagnon, B.J. Thibeault, M.J.W. Rodwell, A.C. Gossard, S. Stemmer, and **S.R. Bank**, "[ErAs epitaxial Ohmic contacts to InGaAs/InP](#)," *Appl. Phys. Lett.*, vol. 94, no. 8, pp. 083505–083505–3, Feb. 2009.
46. R. Kudrawiec, P. Poloczek, J. Misiewicz, H.P. Bae, T. Sarmiento, **S.R. Bank**, H.B. Yuen, M.A. Wistey, and J.S. Harris, "[Contactless electroreflectance of GaInNAsSb/GaNAs/GaAs quantum wells emitting at 1.5–1.65 \$\mu\text{m}\$: Broadening of the fundamental transition](#)," *Appl. Phys. Lett.*, vol. 94, no. 3, pp. 031903, Jan. 2009.
47. U. Singiseti, M.A. Wistey, J.D. Zimmerman, B.J. Thibeault, M.J.W. Rodwell, A.C. Gossard, and **S.R. Bank**, "[Ultralow resistance in situ Ohmic contacts to InGaAs/InP](#)," *Appl. Phys. Lett.*, vol. 93, no. 18, pp. 183502, Nov. 2008.
48. R. Kudrawiec, H.B. Yuen, **S.R. Bank**, H.P. Bae, M.A. Wistey, J.S. Harris, M. Motyka, and J. Misiewicz, "[On the Fermi level pinning in as-grown GaInNAs\(Sb\)/GaAs quantum wells with indium content of 8%–32%](#)," *J. Appl. Phys.*, vol. 104, no. 3, pp. 033526, Aug. 2008.
49. Y.-C. Xin, C.-Y. Lin, Y. Li, H.P. Bae, H.B. Yuen, M.A. Wistey, J.S. Harris, **S.R. Bank**, and L.F. Lester, "[Monolithic 1.55 \$\mu\text{m}\$ GaInNAsSb quantum well passively modelocked lasers](#)," *Electron. Lett.*, vol. 44, no. 9, pp. 581–582, Apr. 2008.
50. R. Kudrawiec, H.B. Yuen, **S.R. Bank**, H.P. Bae, M.A. Wistey, J.S. Harris, M. Motyka, and J. Misiewicz, "[Contactless electroreflectance approach to study the Fermi level position in GaInNAs/GaAs quantum wells](#)," *J. Appl. Phys.*, vol. 102, no. 11, pp. 113501, Dec. 2007.
51. A.M. Crook, E. Lind, Z. Griffith, M.J.W. Rodwell, J.D. Zimmerman, A.C. Gossard, and **S.R. Bank**, "[Low resistance, nonalloyed Ohmic contacts to InGaAs](#)," *Appl. Phys. Lett.*, vol. 91, no. 19, pp. 192114, Nov. 2007.
52. **S.R. Bank**, H. Bae, L.L. Goddard, H.B. Yuen, M.A. Wistey, R. Kudrawiec, and J.S. Harris, "[Recent Progress on 1.55- \$\mu\text{m}\$ Dilute-Nitride Lasers](#)," *IEEE J. Quantum Electron.*, vol. 43, no. 9, pp. 773–785, Sept. 2007.
53. R.D. Averitt, W.J. Padilla, H.T. Chen, J.F. O'Hara, A.J. Taylor, C. Highstrete, M. Lee, J.M.O. Zide, **S.R. Bank**, and A.C. Gossard, "[Terahertz metamaterial devices](#)," *Proc. SPIE*, vol. 6772, pp. 677209, Sept. 2007.
54. M.M. Oye, T.J. Mattord, G.A. Hallock, **S.R. Bank**, M.A. Wistey, J.M. Reifsnider, A.J. Ptak, H.B. Yuen, J.S. Harris, and A.L. Holmes, "[Effects of different plasma species \(atomic N, metastable \$\text{N}_2^*\$, and ions\) on the optical properties of dilute nitride materials grown by plasma-assisted molecular-beam epitaxy](#)," *Appl. Phys. Lett.*, vol. 91, no. 19, pp. 191903, Sept. 2007.
55. D. Shahrjerdi, D.I. Garcia-Gutierrez, T. Akyol, **S.R. Bank**, E. Tutuc, J.C. Lee, and S.K. Banerjee, "[GaAs metal-oxide-semiconductor capacitors using atomic layer deposition of \$\text{HfO}_2\$ gate dielectric: Fabrication and characterization](#)," *Appl. Phys. Lett.*, vol. 91, no. 19, pp. 193503, Sept. 2007.
56. J.S. Harris, R. Kudrawiec, H.B. Yuen, **S.R. Bank**, H.P. Bae, M.A. Wistey, D. Jackrel, E.R. Pickett, T. Sarmiento, L.L. Goddard, V. Lordi, and T. Gugov, "[Development of GaInNAsSb alloys: Growth, band structure, optical properties and applications](#)," *Physica Status Solidi (b)*, vol. 244, no. 8, pp. 2707–2729, July 2007.
57. D.B. Jackrel, **S.R. Bank**, H.B. Yuen, M.A. Wistey, J.S. Jarris, A.J. Ptak, S.W. Johnston, D.J. Friedman, and S.R. Kurtz, "[Dilute nitride GaInNAs and GaInNAsSb solar cells by molecular beam epitaxy](#)," *J. Appl. Phys.*, vol. 101, pp. 114916–1–8, June 2007.

58. H. Chen, W.J. Padilla, J.M.O. Zide, **S.R. Bank**, A.C. Gossard, A.J. Taylor, and R.D. Averitt, "[Ultrafast optical switching of terahertz metamaterials fabricated on ErAs/GaAs nanoisland superlattices](#)," *Opt. Lett.*, vol. 32, no. 12, pp. 1620–1622, June 2007.
59. H.P. Bae, **S.R. Bank**, H.B. Yuen, T. Sarmiento, E.R. Pickett, M.A. Wistey, and J.S. Harris, "[Temperature dependencies of annealing behaviors of GaInNAsSb/GaNAs quantum wells for long wavelength dilute-nitride lasers](#)," *Appl. Phys. Lett.*, vol. 90, no. 23, pp. 231119, June 2007.
60. M.P. Hanson, **S.R. Bank**, J.M.O. Zide, J.D. Zimmerman, and A.C. Gossard, "[Controlling electronic properties of epitaxial nanocomposites of dissimilar materials](#)," *J. Cryst. Growth*, vol. 301-302, pp. 4–9, Apr. 2007.
61. W. Yi, V. Narayanamurti, J.M.O. Zide, **S.R. Bank**, and A.C. Gossard, "[Probing energy barriers and quantum confined states of buried semiconductor heterostructures with ballistic carrier injection: An experimental study](#)," *Phys. Rev. B*, vol. 75, no. 11, pp. 115333, Mar. 2007.
62. R. Kudrawiec, **S.R. Bank**, H.B. Yuen, H. Bae, M.A. Wistey, L.L. Goddard, J.S. Harris, M. Gladysiewicz, M. Motyka, and J. Misiewicz, "[Conduction band offset for Ga_{0.62}In_{0.38}N_xAs_{0.991-x}Sb_{0.009}/Ga_{N_y}As_{1-y}/GaAs systems with the ground state transition at 1.5-1.65 μm](#)," *Appl. Phys. Lett.*, vol. 90, no. 13, pp. 131905, Mar. 2007.
63. R. Kudrawiec, H.B. Yuen, **S.R. Bank**, H.P. Bae, M.A. Wistey, J.S. Harris, M. Motyka, and J. Misiewicz, "[Fermi level shift in GaInNAsSb/GaAs quantum wells upon annealing studied by contactless electroreflectance](#)," *Appl. Phys. Lett.*, vol. 90, no. 6, pp. 061902, Feb. 2007.
64. Y. Xin, A. Stintz, H. Cao, L. Zhang, A. Gray, **S.R. Bank**, M. Osinski, J. Harris, and L. Lester, "[Monolithic passively mode-locked lasers using quantum-dot or quantum-well materials grown on GaAs substrates](#)," *Proc. SPIE, Proc. SPIE*, vol. 6468, pp. 46, San Jose, CA, Jan. 2007.
65. **S.R. Bank**, H.B. Yuen, H. Bae, M.A. Wistey, A. Moto, and J.S. Harris, "[Enhanced luminescence in GaInNAsSb quantum wells through variation of the arsenic and antimony fluxes](#)," *Appl. Phys. Lett.*, vol. 88, no. 24, pp. 241923, June 2006.
66. **S.R. Bank**, H.B. Yuen, H. Bae, M.A. Wistey, and J.S. Harris, "[Overannealing effects in GaInNAs\(Sb\) alloys and their importance to laser applications](#)," *Appl. Phys. Lett.*, vol. 88, no. 22, pp. 221115, May 2006.
67. R. Kudrawiec, M. Motyka, M. Gladysiewicz, J. Misiewicz, H.B. Yuen, **S.R. Bank**, H. Bae, M.A. Wistey, and J.S. Harris, "[Band gap discontinuity in Ga_{0.9}In_{0.1}N_{0.027}As_{0.973-x}Sb_x/GaAs single quantum wells with 0 ≤ x < 0.06 studied by contactless electroreflectance spectroscopy](#)," *Appl. Phys. Lett.*, vol. 88, no. 22, pp. 221113, May 2006.
68. M.A. Wistey, **S.R. Bank**, H.P. Bae, H.B. Yuen, E.R. Pickett, L.L. Goddard, and J.S. Harris, "[GaInNAsSb/GaAs vertical cavity surface emitting lasers at 1534 nm](#)," *Electron. Lett.*, vol. 42, no. 5, pp. 282–283, Mar. 2006.
69. **S.R. Bank**, H.P. Bae, H.B. Yuen, M.A. Wistey, L.L. Goddard, and J.S. Harris, "[Room-temperature continuous-wave 1.55 μm GaInNAsSb laser on GaAs](#)," *Electron. Lett.*, vol. 42, no. 3, pp. 156–157, Feb. 2006.
70. G. Salis, R. Wang, X. Jiang, R.M. Shelby, S.S.P. Parkin, **S.R. Bank**, and J.S. Harris, "[Temperature independence of the spin-injection efficiency of a MgO-based tunnel spin injector](#)," *Appl. Phys. Lett.*, vol. 87, no. 26, pp. 262503, Dec. 2005.
71. **S.R. Bank**, L.L. Goddard, M.A. Wistey, H.B. Yuen, and J.S. Harris, "[On the temperature sensitivity of 1.5-μm GaInNAsSb lasers](#)," *IEEE J. Sel. Topics Quantum Electron.*, vol. 11, no. 5, pp. 1089–1098, Sept. 2005.
72. **S.R. Bank**, H.B. Yuen, M.A. Wistey, V. Lordi, H.P. Bae, and J.S. Harris, "[Effects of growth temperature on the structural and optical properties of 1.55 μm GaInNAsSb quantum wells grown on GaAs](#)," *Appl. Phys. Lett.*, vol. 87, no. 2, pp. 021908, July 2005.
73. **S.R. Bank**, M.A. Wistey, H.B. Yuen, L.L. Goddard, H. Bae, and J.S. Harris, "[Molecular-beam epitaxy growth of low-threshold cw GaInNAsSb lasers at 1.5 μm](#)," *J. Vac. Sci. Technol. B*, vol. 23, no. 3, pp. 1337–1340, June 2005.
74. **S.R. Bank**, M.A. Wistey, H.B. Yuen, V. Lordi, V.F. Gambin, and J.S. Harris, "[Effects of antimony and ion damage on carrier localization in molecular-beam-epitaxy-grown GaInNAs](#)," *J. Vac. Sci. Technol. B*, vol. 23, no. 3, pp. 1320–1323, June 2005.
75. M.A. Wistey, **S.R. Bank**, H.B. Yuen, L.L. Goddard, T. Gugov, and J.S. Harris, "[Protecting wafer surface during plasma ignition using an arsenic cap](#)," *J. Vac. Sci. Technol. B*, vol. 23, no. 3, pp. 1324–1327, May 2005.

76. M.A. Wistey, **S.R. Bank**, H.B. Yuen, J.S. Harris, M.M. Oye, and A.L. Holmes, "[Using beam flux monitor as Langmuir probe for plasma-assisted molecular beam epitaxy](#)," *J. Vac. Sci. Technol. B*, vol. 23, no. 3, pp. 460–464, May 2005.
77. M.A. Wistey, **S.R. Bank**, H.B. Yuen, H. Bae, J.S. Harris, and Jr., "[Nitrogen plasma optimization for high-quality dilute nitrides](#)," *J. Cryst. Growth*, vol. 278, no. 1-4, pp. 229–233, May 2005.
78. M.M. Oye, M.A. Wistey, J.M. Reifsnider, S. Agarwal, T.J. Mattord, S. Govindaraju, G.A. Hallock, A.L. Holmes, **S.R. Bank**, H.B. Yuen, and J.S. Harris, "[Ion damage effects from negative deflector plate voltages during the plasma-assisted molecular-beam epitaxy growth of dilute nitrides](#)," *Appl. Phys. Lett.*, vol. 86, no. 22, pp. 221902, May 2005.
79. L.L. Goddard, **S.R. Bank**, M.A. Wistey, H.B. Yuen, and J.S. Harris Jr, "[High performance GaInNAsSb/GaAs lasers at 1.5 \$\mu\text{m}\$](#) ," *Proc. SPIE*, vol. 2, pp. 2–5, Apr. 2005.
80. L.L. Goddard, **S.R. Bank**, M.A. Wistey, H.B. Yuen, Z. Rao, and J.S. Harris, "[Recombination, gain, band structure, efficiency, and reliability of 1.5- \$\mu\text{m}\$ GaInNAsSb/GaAs lasers](#)," *J. Appl. Phys.*, vol. 97, no. 8, pp. 083101, Apr. 2005.
81. V. Lordi, H.B. Yuen, **S.R. Bank**, M.A. Wistey, J.S. Harris, and S. Friedrich, "[Nearest-neighbor distributions in \$\text{Ga}_{1-x}\text{In}_x\text{N}_y\text{As}_{1-y}\$ and \$\text{Ga}_{1-x}\text{In}_x\text{N}_y\text{As}_{1-y-z}\text{Sb}_z\$ thin films upon annealing](#)," *Phys. Rev. B*, vol. 71, no. 12, pp. 125309, Mar. 2005.
82. R. Kudrawiec, K. Ryczko, J. Misiewicz, H.B. Yuen, **S.R. Bank**, M.A. Wistey, H.P. Bae, and J.S. Harris, "[Band-gap discontinuity in \$\text{GaN}_{0.02}\text{As}_{0.87}\text{Sb}_{0.11}\$ /GaAs single-quantum wells investigated by photoreflectance spectroscopy](#)," *Appl. Phys. Lett.*, vol. 86, no. 14, pp. 141908, Mar. 2005.
83. R. Kudrawiec, P. Sitarek, J. Misiewicz, **S.R. Bank**, H.B. Yuen, M.A. Wistey, and J.S. Harris, "[Interference effects in electromodulation spectroscopy applied to GaAs-based structures: A comparison of photoreflectance and contactless electroreflectance](#)," *Appl. Phys. Lett.*, vol. 86, no. 9, pp. 091115, Feb. 2005.
84. X. Jiang, R. Wang, R.M. Shelby, R.M. Macfarlane, **S.R. Bank**, J.S. Harris, and S.S.P. Parkin, "[Highly Spin-Polarized Room-Temperature Tunnel Injector for Semiconductor Spintronics using MgO\(100\)](#)," *Phys. Rev. Lett.*, vol. 94, no. 5, pp. 056601, Feb. 2005.
85. R. Kudrawiec, H.B. Yuen, K. Ryczko, J. Misiewicz, **S.R. Bank**, M.A. Wistey, H.P. Bae, and J.S. Harris, "[Photoreflectance and photoluminescence investigations of a step-like GaInNAsSb/GaAsN/GaAs quantum well tailored at 1.5 \$\mu\text{m}\$: The energy level structure and the Stokes shift](#)," *J. Appl. Phys.*, vol. 97, no. 5, pp. 053515, Feb. 2005.
86. R. Wang, X. Jiang, R.M. Shelby, R.M. Macfarlane, S.S.P. Parkin, **S.R. Bank**, and J.S. Harris, "[Increase in spin injection efficiency of a CoFe/MgO\(100\) tunnel spin injector with thermal annealing](#)," *Appl. Phys. Lett.*, vol. 86, no. 5, pp. 052901, Jan. 2005.
87. D. Gollub, M. Kamp, A. Forchel, J. Seufert, **S.R. Bank**, M.A. Wistey, H.B. Yuen, L.L. Goddard, and J.S. Harris, "[Continuous-wave operation of GaInNAsSb distributed feedback lasers at 1.5 \$\mu\text{m}\$](#) ," *Electron. Lett.*, vol. 40, no. 23, pp. 1487–1488, Nov. 2004.
88. J.S. Harris, **S.R. Bank**, M.A. Wistey, and H.B. Yuen, "[GaInNAs\(Sb\) long wavelength communications lasers](#)," *IEE Proc. Optoelectron.*, vol. 151, no. 5, pp. 407–416, Oct. 2004.
89. **S.R. Bank**, M.A. Wistey, L.L. Goddard, H.B. Yuen, H.P. Bae, and J.S. Harris, "[High-performance 1.5 \$\mu\text{m}\$ GaInNAsSb lasers grown on GaAs](#)," *Electron. Lett.*, vol. 40, no. 19, pp. 1186–1187, Sept. 2004.
90. V. Lordi, H.B. Yuen, **S.R. Bank**, and J.S. Harris, "[Quantum-confined Stark effect of GaInNAs\(Sb\) quantum wells at 1300–1600 nm](#)," *Appl. Phys. Lett.*, vol. 85, no. 6, pp. 902–904, Aug. 2004.
91. **S.R. Bank**, M.A. Wistey, L.L. Goddard, H.B. Yuen, V. Lordi, and J.S. Harris, "[Low-threshold continuous-wave 1.5- \$\mu\text{m}\$ GaInNAsSb lasers grown on GaAs](#)," *IEEE J. Quantum Electron.*, vol. 40, no. 6, pp. 656–664, June 2004.
92. J. Fu, **S.R. Bank**, M.A. Wistey, H.B. Yuen, and J.S. Harris, "[Solid-source molecular-beam epitaxy growth of GaInNAsSb/InGaAs single quantum well on InP with photoluminescence peak wavelength at 2.04 \$\mu\text{m}\$](#) ," *J. Vac. Sci. Technol. B*, vol. 22, no. 3, pp. 1463–1467, May 2004.
93. T. Gugov, V. Gambin, M. Wistey, H. Yuen, **S.R. Bank**, and J.S. Harris, "[Use of transmission electron microscopy in the characterization of GaInNAs\(Sb\) quantum well structures grown by molecular beam epitaxy](#)," *J. Vac. Sci. Technol. B*, vol. 22, no. 3, pp. 1588–1592, May 2004.
94. M.A. Wistey, **S.R. Bank**, H.B. Yuen, L.L. Goddard, and J.S. Harris, "[GaInNAs\(Sb\) vertical-cavity surface-emitting lasers at 1.460 \$\mu\text{m}\$](#) ," *J. Vac. Sci. Technol. B*, vol. 22, no. 3, pp. 1562–1564, May 2004.
95. M.A. Wistey, **S.R. Bank**, H.B. Yuen, L.L. Goddard, and J.S. Harris, "[Monolithic, GaInNAsSb VCSELs at 1.46 \$\mu\text{m}\$ on GaAs by MBE](#)," *Electron. Lett.*, vol. 39, no. 25, pp. 1822–1823, Dec. 2003.

96. **S.R. Bank**, M.A. Wistey, H.B. Yuen, L.L. Goddard, W. Ha, and J.S. Harris, "[Low-threshold CW GaInNAsSb/GaAs laser at 1.49 \$\mu\text{m}\$](#) ," *Electron. Lett.*, vol. 39, no. 20, pp. 1445–1446, Oct. 2003.
97. **S.R. Bank**, W. Ha, V. Gambin, M. Wistey, H. Yuen, L. Goddard, S. Kim, and J.S. Harris, "[1.5 \$\mu\text{m}\$ GaInNAs\(Sb\) lasers grown on GaAs by MBE](#)," *J. Cryst. Growth*, vol. 251, no. 1-4, pp. 367–371, Apr. 2003.
98. K. Volz, V. Gambin, W. Ha, M.A. Wistey, H. Yuen, **S.R. Bank**, and J.S. Harris, "[The role of Sb in the MBE growth of \(GaIn\)\(NAsSb\)](#)," *J. Cryst. Growth*, vol. 251, no. 1-4, pp. 360–366, Apr. 2003.
99. V. Gambin, W. Ha, M. Wistey, H. Yuen, **S.R. Bank**, S.M. Kim, and J.S. Harris, "[GaInNAsSb for 1.3–1.6 \$\mu\text{m}\$ -long wavelength lasers grown by molecular beam epitaxy](#)," *IEEE J. Sel. Topics Quantum Electron.*, vol. 8, no. 4, pp. 795–800, July 2002.
100. W. Ha, V. Gambin, M. Wistey, **S.R. Bank**, S. Kim, and J.S. Harris, "[Multiple-quantum-well GaInNAs-GaNAs ridge-waveguide laser diodes operating out to 1.4 \$\mu\text{m}\$](#) ," *IEEE Photonics Technol. Lett.*, vol. 14, no. 5, pp. 591–593, May 2002.
101. W. Ha, V. Gambin, M. Wistey, **S.R. Bank**, H. Yuen, S. Kim, and J.S. Harris, "[Long wavelength GaInNAsSb/GaNAsSb multiple quantum well lasers](#)," *Electron. Lett.*, vol. 38, no. 6, pp. 277–278, Mar. 2002.
102. T. Chung, **S.R. Bank**, J. Epple, and K. Hsieh, "[Current gain dependence on subcollector and etch-stop doping in InGaP/GaAs HBTs](#)," *IEEE Trans. Electron Devices*, vol. 48, no. 5, pp. 835–839, May 2001.
103. T. Chung, **S.R. Bank**, and K.C. Hsieh, "[High DC current gain InGaP/GaAs HBTs grown by LP-MOCVD](#)," *Electron. Lett.*, vol. 36, no. 22, pp. 1885–1886, Oct. 2000.

Conference Presentations

1. **(Invited) S.R. Bank**, S. J. Maddox, M. Ren, M. Woodson, A.K. Rockwell, J.C. Campbell, "Staircase and Homojunction Avalanche Detectors in InAlAsSb," to be presented at the Workshop on Innovative Nanoscale Devices and Systems (WINDS), Kohala Coast, Hawaii, Dec. 2016.
2. **(Invited) S.R. Bank**, "Digital Alloy Growth of AllInAsSb for Low Noise Avalanche Photodetectors," to be presented at the 5th International Conference and Exhibition on Lasers, Optics & Photonics, Atlanta, GA, Nov. 2016.
3. M. Ren, M. Woodson, Y. Chen and J. Campbell, S.J. Maddox and **S.R. Bank**, "AllInAsSb Separate Absorption, Charge, and Multiplication Avalanche Photodiodes," 29th IEEE Photonics Conference, Waikoloa Village, HA, Oct. 2016.
4. A.K. Rockwell, S. Maddox, S. March, Y. Sun, D. Jung, M.L. Lee, **S.R. Bank**, "Growth and Properties of Broadly-Tunable AllInAsSb DigitalAlloys on GaSb," 32nd North American Conference on Molecular Beam Epitaxy (NAMBE 2016), Saratoga Springs, NY, Sept. 2016.
5. **(Invited) S. R. Bank**, S. J. Maddox, A. K. Rockwell, W. Sun, and J.C. Campbell, "Digital Alloy Growth of AllInAsSb for Low Noise Avalanche Photodetectors," 18th International Conference on Crystal Growth and Epitaxy (ICCGE18), Nagoya, Japan, Aug. 2016.
6. K. Chen, D. Akinwande, **S. Bank**, and Y. Wang, "A Novel Optical Grating Technique to Measure Photo-Excited Carrier Transport Property in Electronic Materials," *58th Electronic Materials Conf. (EMC)*, Newark, DE, June 2016.
7. **(Awarded Student Paper Award)** D.J. Ironside, A.M. Crook, A.M. Skipper, and **S.R. Bank**, "Optimal Integration of Rare-Earth Monopnictide Nanostructures in III-V for High Optical Quality Applications," *submitted to 58th Electronic Materials Conf. (EMC)*, Newark, DE, June 2016.
8. A.K. Rockwell, S.J. Maddox, D. Jung, Y. Sun, S.D. Sifferman, W. Sun, M. Ren, J. Guo, J.C. Campbell, M.L. Lee, and **S.R. Bank**, "The Effect of Period Thickness on AllInAsSb Digital Alloys on GaSb," *58th Electronic Materials Conf. (EMC)*, Newark, DE, June 2016.
9. E.S. Walker, S.R. Na, D. Jung, S.D. March, Y. Liu, T. Trivedi, W. Li, L. Tao, M.L. Lee, K.M. Liechti, D. Akinwande, and **S.R. Bank**, "Growth and Transfer of Epitaxial Bismuth Films for Flexible Electronics," *58th Electronic Materials Conf. (EMC)*, Newark, DE, June 2016.
10. (Late News) M. Ren et al. **S.R. Bank**, and J.C. Campbell, "AllInAsSb Separate Absorption, Charge, and Multiplication Avalanche Photodiodes," Presented at the 74th Device Research Conf. (DRC), Newark, DE, June 2016.
11. S. J. Maddox et al. and **S.R. Bank**, "Low-Noise High-Gain Tunneling Staircase Photodetector," Presented at the 74th Device Research Conf. (DRC), Newark, DE, June 2016.

12. (Upgraded to Invited) M. Ren, S. J. Maddox, M. Woodson, Y. Chen, **S.R. Bank**, and J. Campbell, "Low Excess Noise Al_xIn_{1-x}As_ySb_{1-y} (x: 0.3~0.7) Avalanche Photodiodes," IEEE/OSA Conf. on Lasers and Electro Optics (CLEO), San Jose, CA, May 2016.
13. (*Invited*) **S.R. Bank**, S.J. Maddox, S.D. March, W. Sun, M. Ren, and J.C. Campbell, "Advances in IR APD materials research," *SPIE Defense and Commercial Sensing*, Baltimore, MD, Apr. 2016.
14. (*Invited*) J.C. Campbell, and **S.R. Bank**, "Recent progress in avalanche photodiodes for sensing in the IR spectrum," *SPIE Defense and Commercial Sensing*, Baltimore, MD, Apr. 2016.
15. K. Chen, Y. Wang, D. Akinwande, **S. Bank**, and J.-F. Lin, "A novel grating-imaging method to measure carrier diffusion coefficient in graphene," *American Physical Society (APS) March Meeting*, Baltimore, MD, Mar. 2016.
16. (*Invited*) **S.R. Bank**, S.D. Sifferman, H.P. Nair, N.T. Sheehan, R. Salas, S.J. Maddox, and A.M. Crook, "Highly strained type-I diode lasers on GaSb," *SPIE Photonics West*, San Francisco, CA, Feb. 2016.
17. (*Invited*) **S.R. Bank**, S.J. Maddox, W. Sun, H.P. Nair, and J.C. Campbell, "Recent progress in high gain InAs avalanche photodiodes," *SPIE Optics and Photonics Meeting*, San Diego, CA, Aug. 2015.
18. H.R. Seren, G.R. Keiser, J. Zhang, S.J. Maddox, X. Zhao, K. Fan, **S.R. Bank**, X. Zhang, and R.D. Averitt, "THz materials discovery and integration: the search for novel functionality," *International Conf. on Infrared, Millimeter, and Terahertz Waves*, Hong Kong, Aug. 2015.
19. S.J. Maddox, S.D. March, W. Sun, J.C. Campbell, and **S.R. Bank**, "Growth and Properties of Broadly Tunable AllInAsSb Digital Alloys on GaSb," *57th Electronic Materials Conf. (EMC)*, Columbus, OH, June 2015.
20. K.M. McNicholas, E.M. Krivoy, R. Salas, S.D. Sifferman, and **S.R. Bank**, "Tunable, lattice-matched, epitaxial semimetals," *57th Electronic Materials Conf. (EMC)*, Columbus, OH, June 2015.
21. R. Salas, N.T. Sheehan, S. Guchhait, K.M. McNicholas, S.D. Sifferman, V.D. Dasika, E.M. Krivoy, and **S.R. Bank**, "Properties of Growth Enhanced ErAs:InGaAs Nanocomposites," *57th Electronic Materials Conf. (EMC)*, Columbus, OH, June 2015.
22. S.D. Sifferman, R. Salas, S.J. Maddox, H.P. Nair, N.T. Sheehan, E.M. Krivoy, E.S. Walker, and **S.R. Bank**, "Surfactant-mediated growth of highly strained materials for mid-infrared applications," *57th Electronic Materials Conf. (EMC)*, Columbus, OH, June 2015.
23. E.S. Walker, W. Li, S. Guchhair, M. Yogeesh, F. He, Y. Wang, D. Akinwande, and **S.R. Bank**, "In Situ Oxidation of Bismuth Thin Films Grown by Molecular Beam Epitaxy for Device Applications," *57th Electronic Materials Conf. (EMC)*, Columbus, OH, June 2015.
24. (*Late News*) M. Ren, S.J. Maddox, Y. Chan, M. Woodson, **S.R. Bank**, J.C. Campbell, "Low Excess Noise AllInAsSb Staircase Avalanche Photodiode," *73rd Device Research Conf. (DRC)*, Santa Barbara, Ca, June 2015.
25. H.R. Seren, J. Zhang, X. Zhao, K. Fan, **S. Bank**, R.D. Averitt, and X. Zhang, "InAs Metamaterials on Flexible Substrate," *2014 Materials Research Society (MRS) Fall Meeting*, Boston, MA, Dec. 2014.
26. D.J. Ironside, R. Salas, P. Chen, K.Q. Le, A. Alu, and **S.R. Bank**, "Employing Metamaterials for Enhanced THz Generation in Photomixers," *IEEE Photonics Conf. (IPC)*, San Diego, CA, Oct. 2014.
27. D.J. Ironside, E.M. Krivoy, V.D. Dasika, and **S.R. Bank**, "Dislocation-filtering with Rare-earth Monopnictide Nanoparticles Embedded in Metamorphic Buffer Layers," *International Molecular Beam Epitaxy Conf. (ICMBE)*, Flagstaff, AZ, Sept. 2014.
28. R. Salas, S. Guchhait, S.D. Sifferman, K.M. McNicholas, V.D. Dasika, D. Jung, M.L. Lee, and **S.R. Bank**, "Surfactant-Mediated Growth of RE-As:InGaAs Nanocomposites," *International Molecular Beam Epitaxy Conf. (IMBE)*, Flagstaff, AZ, Sept. 2014.
29. S.J. Maddox, A.P. Vasudev, V.D. Dasika, S. March, M.L. Brongersma, and **S.R. Bank**, "Effects of Growth Rate, Substrate Temperature, and a Bi Surfactant on Doping Limits in InAs:Si Grown by Molecular Beam Epitaxy," *56th Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2014.
30. K.M. McNicholas, E.M. Krivoy, R. Salas, and **S.R. Bank**, "GdAs Thin Films Grown By Molecular Beam Epitaxy," *56th Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2014.
31. A.K. Rockwell, S.J. Maddox, R. Salas, V. Dasika, and **S.R. Bank**, "Rapid Thermal Annealing of Ion Implanted InAs:S for Mid-IR Plasmonics," *56th Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2014.
32. R. Salas, S. Guchhait, S.D. Sifferman, K.M. McNicholas, V.D. Dasika, D.J. Ironside, E.M. Krivoy, S.J. Maddox, D. Jung, M.L. Lee, and **S.R. Bank**, "Properties of RE-As:InGaAs Nanocomposites," *56th Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2014.

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33. S.D. Sifferman, J.W. Schwede, D.C. Riley, R.T. Howe, Z. Shen, N.A. Melosh, and **S.R. Bank**, "Compositionally-Graded Structures for Photon-Enhanced Thermionic Emitters," *56th Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2014.
34. E.S. Walker, E. Krivoy, M. Yogeesh, D. Akinwande, and **S.R. Bank**, "Semiconducting Bismuth Thin Films Grown by Molecular Beam Epitaxy for Device Applications," *56th Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2014.
35. W. Sun, S.J. Maddox, **S.R. Bank**, and J.C. Campbell, "Record High Gain from InAs Avalanche Photodiodes at Room Temperature," *72nd Device Research Conf. (DRC)*, Santa Barbara, Ca, June 2014.
36. **(Invited) S.R. Bank**, "Epitaxy of terahertz, plasmonic and infrared devices," *2014 Lawrence Symposium of Epitaxy*, Scottsdale, AZ, Feb. 2014.
37. S.J. Maddox, A.P. Vasudev, V.D. Dasika, M.L. Brongersma, and **S.R. Bank**, "Exploring the Limits of Silicon Doping in InAs for Mid-Infrared Plasmonics," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, Banff, Alberta, Canada, Oct. 2013.
38. **(Invited) S.R. Bank**, "Recent Advances in InAs Avalanche Photodiodes," *2013 IEEE Photonics Society Conference (IPC)*, Bellevue, WA, Sept. 2013.
39. **(Invited) S.R. Bank**, E.M. Krivoy, and S.J. Maddox, "Growth of epitaxial doped semiconductor and semimetallic plasmonic materials," *SPIE Optics and Photonics Meeting*, San Diego, Ca, Aug. 2013.
40. H.P. Nair, R. Salas, N.T. Sheehan, S.J. Maddox, and **S.R. Bank**, "3.4 μm Diode Lasers Employing Al-Free GaInAsSb/GaSb MQW Active Regions at 20 $^{\circ}\text{C}$," *71st Device Research Conf. (DRC)*, South Bend, IN, June 2013.
41. S.J. Maddox, K.M. Yu, A.J. Ptak, H.P. Nair, V.D. Dasika, and **S.R. Bank**, "Optical and Structural Characterization of InAsBi and InGaAsBi Grown by Molecular Beam Epitaxy," *Electronic Materials Conf. (EMC)*, South Bend, IN, June 2013.
42. K.W. Park, H.P. Nair, E.M. Krivoy, **S.R. Bank**, and E.T. Yu, "Thermal characterization of rare earth/III-V superlattice and nanocomposite structures using scanned probe microscopy," *55th Electronic Materials Conf. (EMC)*, South Bend, IN, June 2013.
43. S. Rahimi, E.M. Krivoy, J. Lee, **S.R. Bank**, and D. Akinwande, "Temperature and Thickness Dependence of Electrical Resistivity of LaLuAs," *55th Electronic Materials Conf. (EMC)*, South Bend, IN, June 2013.
44. R. Salas, S. Guchhait, H.P. Nair, E.M. Krivoy, S.J. Maddox, and **S.R. Bank**, "Carrier Dynamics and Electrical Properties of LuAs:InGaAs Superlattices," *55th Electronic Materials Conf. (EMC)*, South Bend, IN, June 2013.
45. V.D. Dasika, E.M. Krivoy, H.P. Nair, S.J. Maddox, K.W. Park, D. Jung, M.L. Lee, E.T. Yu, and **S.R. Bank**, "InAs Quantum Dot Growth using Bismuth as a Surfactant for Optoelectronic Applications," *Conf. on Lasers and Electro Optics (CLEO)*, San Jose, CA, June 2013.
46. E.M. Krivoy, A. Vasudev, H.P. Nair, V.D. Dasika, R. Synowicki, R. Salas, S.J. Maddox, M. Brongersma, and **S.R. Bank**, "Tunable, Epitaxial, Semimetallic Films for Plasmonics," *to be presented at the Conf. on Lasers and Electro Optics (CLEO)*, San Jose, CA, June 2013.
47. A. Rundquist, A. Majumdar, M. Bajcsy, V.D. Dasika, **S.R. Bank**, and J. Vuckovic, "Photonic crystal coupled cavity arrays for quantum simulation," *Conf. on Lasers and Electro Optics (CLEO)*, San Jose, CA, June 2013.
48. K. Appaiah, R. Salas, S. Vishwanath, and **S.R. Bank**, "Enhancing data rates in graded-index multimode fibers with offset coupling and multiplexing," *Optical Fiber Communication Conf. (OFC)*, Anaheim, CA, Mar. 2013.
49. K.W. Park, H.P. Nair, **S.R. Bank**, and E.T. Yu, "Proximal Probe Characterization of Thermal Conductivity in ErAs/GaAs Superlattice Grown by Molecular Beam Epitaxy," *40th Conference on the Physics & Chemistry of Surfaces & Interfaces*, Waikoloa, HI, Jan. 2013.
50. E.M. Krivoy, H.P. Nair, A.M. Crook, S. Rahimi, Y. Jiang, S.J. Maddox, R. Salas, G. Kelp, G. Shvets, M.A. Belkin, D. Akinwande, and **S.R. Bank**, "Rare-earth mononpnictide alloys for tunable epitaxial semimetals," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, Atlanta, GA, Oct. 2012.
51. S.J. Maddox, A.P. Vasudev, V.D. Dasika, M.L. Brongersma, and **S.R. Bank**, "Bismuth Surfactant-Mediated Epitaxy of Highly Doped InAs for Mid-Infrared Plasmonics," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, Stone Mountain Park, GA, Oct. 2012.
52. W. Sun, S.J. Maddox, Z. Lu, H.P. Nair, X. Zheng, **S.R. Bank**, and J.C. Campbell, "Charge-Compensated High Gain InAs Avalanche Photodiodes," *IEEE Photonics Conf. (IPC)*, Burlingame, CA, Sept. 2012.

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53. **(Invited) S.R. Bank**, E.M. Krivoy, A.M. Crook, H.P. Nair, R. Salas, and V.D. Dasika, "New Epitaxial Metallic Nanostructure Materials for Photonic Devices," *SPIE Optics and Photonics Meeting*, San Diego, CA, Aug. 2012.
54. S.J. Maddox, H.P. Nair, V.D. Dasika, E.M. Krivoy, R. Salas, and **S.R. Bank**, "Molecular Beam Epitaxy Growth-Space Investigation of InAsBi and InGaAsBi on InAs," *International Symposium on Compound Semiconductors (ISCS)*, Santa Barbara, CA, Aug. 2012.
55. K.W. Park, V.D. Dasika, H.P. Nair, A.M. Crook, **S.R. Bank**, and E.T. Yu, "Scanned Probe Characterization of ErAs/GaAs Nanostructures below the Resolution Limit via Statistical Analysis," *International Symposium on Compound Semiconductors (ISCS)*, Santa Barbara, CA, Aug. 2012.
56. K. Appaiah, S. Vishwanath, and **S.R. Bank**, "Device Design and Signal Processing for Multiple-Input Multiple- Output Multimode Fiber Links," *IEEE International Conf. on Communications (ICC)*, Toronto, ON, June 2012.
57. A.M. Crook, H.P. Nair, J.H. Lee, D.A. Ferrer, D. Akinwande, and **S.R. Bank**, "Overgrowth of Epitaxially-Embedded ErAs Films on GaAs," *54th Electronic Materials Conf. (EMC)*, University Park, PA, June 2012.
58. V.D. Dasika, E.M. Krivoy, H.P. Nair, K.W. Park, E.T. Yu, and **S.R. Bank**, "InAs Quantum Dot Growth using Bi as a Surfactant," *54th Electronic Materials Conf. (EMC)*, University Park, PA, June 2012.
59. E.M. Krivoy, H.P. Nair, A.M. Crook, S. Rahimi, Y. Jiang, S.J. Maddox, R. Salas, M.A. Belkin, D. Akinwande, and **S.R. Bank**, "Rare-earth monpnictides films for tunable frequency transparent Ohmic contacts," *54th Electronic Materials Conf. (EMC)*, June 2012.
60. E.M. Krivoy, H.P. Nair, S.J. Maddox, R. Salas, S. Rahimi, Y. Jiang, M.A. Belkin, D. Akinwande, and **S.R. Bank**, "Growth of high-quality rocksalt LaAs on LuAs seeded templates," *54th Electronic Materials Conf. (EMC)*, June 2012.
61. S.J. Maddox, H.P. Nair, V.D. Dasika, E.M. Krivoy, R. Salas, and **S.R. Bank**, "Molecular Beam Epitaxial Growth and Optical Quality of InAsBi," *54th Electronic Materials Conf. (EMC)*, State College, PA, June 2012.
62. S.J. Maddox, W. Sun, Z. Lu, H.P. Nair, J.C. Campbell, and **S.R. Bank**, "InAs Avalanche Photodiode with Improved Electric Field Uniformity," *70th Device Research Conf. (DRC)*, State College, PA, June 2012.
63. H.P. Nair, A.M. Crook, K.M. Yu, and **S.R. Bank**, "Thermal Annealing Induced Optical Quality Enhancement in GaSb-Based Dilute-Nitrides," *54th Electronic Materials Conf. (EMC)*, University Park, PA, June 2012.
64. R. Salas, A.M. Crook, H.P. Nair, E.M. Krivoy, S.J. Maddox, and **S.R. Bank**, "LuAs/InGaAs Photoconductive Materials for Heterodyne Terahertz Generation," *54th Electronic Materials Conf. (EMC)*, University Park, PA, June 2012.
65. A.P. Vasudev, S.J. Maddox, M.L. Brongersma, and **S.R. Bank**, "Mid-Infrared Surface Plasmons on Epitaxial Semiconductors," *Gordon Research Conf.*, Waterville, ME, June 2012.
66. K. Appaiah, S. Zisman, S. Vishwanath, and **S. Bank**, "Dynamic Detector Selection for Multiple-Input Multiple-Output (MIMO) Multimode Fiber Links," *Conf. on Lasers and Electro Optics (CLEO)*, San Jose, CA, May 2012.
67. H.P. Nair, A.M. Crook, K.M. Yu, and **S.R. Bank**, "Dilute-Nitride Active Regions on GaSb for Mid-Infrared Semiconductor Diode Lasers," *Conf. on Lasers and Electro Optics (CLEO)*, San Jose, CA, May 2012.
68. R. Salas, A.M. Crook, H.P. Nair, E.M. Krivoy, S.J. Maddox, and **S.R. Bank**, "LuAs/InGaAs Photoconductive Materials for Heterodyne Terahertz Generation," *54th Electronic Materials Conf. (EMC)*, University Park, PA, June 2012.
69. A.P. Vasudev, S.J. Maddox, M.L. Brongersma, and **S.R. Bank**, "Mid-Infrared Surface Plasmons on Epitaxial Semiconductors," *Gordon Research Conf.*, Waterville, ME, June 2012.
70. K. Appaiah, S. Zisman, S. Vishwanath, and **S. Bank**, "Dynamic Detector Selection for Multiple-Input Multiple-Output (MIMO) Multimode Fiber Links," *Conf. on Lasers and Electro Optics (CLEO)*, San Jose, CA, May 2012.
71. H.P. Nair, A.M. Crook, K.M. Yu, and **S.R. Bank**, "Dilute-Nitride Active Regions on GaSb for Mid-Infrared Semiconductor Diode Lasers," *Conf. on Lasers and Electro Optics (CLEO)*, San Jose, CA, May 2012.
72. **(Invited) S.R. Bank**, S. Vishwanath, K. Appaiah, and S. Zisman, "Device Design for Multiple-Input Multiple-Output (MIMO) Over Multimode Optical Fiber," *SPIE Photonics West*, San Francisco, CA, Jan. 2012.

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73. K.W. Park, V.D. Dasika, H.P. Nair, A.M. Crook, **S.R. Bank**, and E.T. Yu, "Scanned Probe Characterization of ErAs/GaAs Nanostructures below the Resolution Limit via Statistical Analysis," *International Symposium on Compound Semiconductors (ISCS)*, 2012.
74. **(Invited) S.R. Bank**, "Towards Epitaxial Integration of Metallic Nanostructures into Photonic Device," *SPIE Optics and Photonics Meeting*, San Diego, Ca, Aug. 2011.
75. A.M. Crook, H.P.N.J.H. Lee, D.A. Ferrer, D. Akinwande, and **S.R. Bank**, "Nanoparticle Seeded Growth of ErAs Films Embedded in GaAs," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, San Diego, CA, Aug. 2011.
76. A.M. Crook, H.P. Nair, D.A. Ferrer, and **S.R. Bank**, "Growth of semimetallic ErAs films epitaxially embedded in GaAs," *SPIE NanoScience and Engineering*, San Diego, CA, Aug. 2011.
77. E.M. Krivoy, S.J. Maddox, H.P. Nair, A.M. Crook, V.D. Dasika, D.A. Ferrer, and **S.R. Bank**, "LuAs films and nanostructures," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, San Diego, CA, Aug. 2011.
78. H.P. Nair, A.M. Crook, K.M. Yu, and **S.R. Bank**, "Room Temperature Photoluminescence from a GaSb-Based Dilute-Nitride QW," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, San Diego, CA, Aug. 2011.
79. R. Salas, E.M. Krivoy, A.M. Crook, H.P. Nair, and **S.R. Bank**, "Compositional Grading of In_xGa_{1-x}As/GaAs Tunnel Junctions Enhanced by ErAs Nanoparticles," *Society of Photo-optical Instrumentation Engineers (SPIE) - Optics and Photonics Conference*, San Diego, CA, Aug. 2011.
80. A.M. Crook, H.P. Nair, D.A. Ferrer, and **S.R. Bank**, "Growth of Epitaxially-Embedded ErAs Films in GaAs," *53rd Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2011.
81. R. Salas, E.M. Krivoy, A.M. Crook, H.P. Nair, and **S.R. Bank**, "Compositional Grading of GaAs-Based Tunnel Junctions Containing ErAs Nanostructures," *53rd Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2011.
82. K. Appaiah, S. Vishwanath, and **S.R. Bank**, "Multiple-Input Multiple-Output with Predistortion and Signal Processing for Multimode Fiber Links," *Conf. on Lasers and Electro Optics (CLEO)*, Baltimore, MD, May 2011.
83. A.M. Crook, H.P. Nair, and **S.R. Bank**, "Nanoparticle-Enhanced Tunnel Junctions for Reduced Free-Carrier Absorption in Mid-IR Lasers," *Conf. on Lasers and Electro Optics (CLEO)*, Baltimore, MD, May 2011.
84. A.M. Crook, H.P. Nair, D.A. Ferrer, and **S.R. Bank**, "Growth of Rare-Earth Monopnictide Films via Epitaxial Embedding for Plasmonics," *International Symposium on Compound Semiconductors (ISCS)*, Berlin, Germany, May 2011.
85. H.P. Nair, A.M. Crook, and **S.R. Bank**, "An Epitaxial Metal/Semiconductor System for Active Plasmonics," *Conf. on Lasers and Electro Optics (CLEO)*, Baltimore, MD, May 2011.
86. A.M. Crook, H.P. Nair, K.W. Park, E.T. Yu, and **S.R. Bank**, "Investigating the MBE Overgrowth of Semimetallic Nanoparticles for Nanophotonics," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, Breckenridge, CO, Sept. 2010.
87. H.P. Nair, A.M. Crook, K.W. Park, D.A. Ferrer, S.K. Banerjee, E.T. Yu, and **S.R. Bank**, "Investigation of MBE-grown ErAs nanoparticle morphology for high-performance optical and electronic devices," *North American Molecular Beam Epitaxy Conference*, Breckenridge, CO, Sept. 2010.
88. A.M. Crook, H.P. Nair, K.W. Park, E.T. Yu, and **S.R. Bank**, "Overgrowth Investigation of Epitaxial Semimetallic Nanoparticles for Photonic Devices," *52nd Electronic Materials Conf. (EMC)*, Notre Dame, IN, June 2010.
89. K.W. Park, A.M. Crook, H.P. Nair, **S.R. Bank**, and E.T. Yu, "Scanned Probe Characterization of Self-Assembled ErAs/GaAs Semimetal/Semiconductor Nanostructures Grown by Molecular Beam Epitaxy," *52nd Electronic Materials Conf. (EMC)*, Notre Dame, IN, June 2010.
90. **(Invited) S.R. Bank**, A.M. Crook, and H.P. Nair, "Nanoparticle-enhanced tunnel junctions for high-efficiency solar cells and mid-infrared lasers," *216th Electrochemical Society (ECS) Meeting*, Vienna, Austria, Oct. 2009.
91. A.M. Crook, H.P. Nair, and **S.R. Bank**, "High-Performance Metal Nanoparticle-Enhanced Tunnel Junctions for Photonic Devices," *International Symposium on Compound Semiconductors (ISCS)*, Santa Barbara, CA, Sept. 2009.
92. **(Invited) S.R. Bank**, "Enhancing Diode Lasers with Metallic Nanoparticles," *IEEE/LEOS Semiconductor Laser Workshop*, Baltimore, MD, June 2009.

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93. A.M. Crook, H.P. Nair, K. Vijayraghavan, M.A. Wistey, J.D. Zimmerman, J.M.O. Zide, A.C. Gossard, and **S.R. Bank**, "Annealing Stability of Nanoparticle-Enhanced Tunnel Junctions for High-Efficiency Solar Cells and Mid-Infrared Lasers," *51st Electronic Materials Conf. (EMC)*, University Park, PA, June 2009.
94. M. Pelliccione, A. Sciambi, D. Goldhaber-Gordon, **S.R. Bank**, A.C. Gossard, J.L. Reno, and M. Lilly, "Tunneling spectroscopy of a 2D-2D tunnel junction: Towards a local spectroscopic probe of 2D electron systems," *American Physical Society (APS) March Meeting*, Mar. 2009.
95. A. Sciambi, M. Pelliccione, D. Goldhaber-Gordon, **S.R. Bank**, A.C. Gossard, M. Lilly, and J.L. Reno, "The Virtual Scanning Tunneling Microscope: Induced Tunneling in Bilayer Two-Dimensional Electron Systems," *American Physical Society (APS) March Meeting*, Mar. 2009.
96. H.P. Nair, A.M. Crook, J.M.O. Zide, M.P. Hanson, A.C. Gossard, and **S.R. Bank**, "Nanoparticle-enhanced tunnel junctions for high efficiency mid-infrared lasers," *50th Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2008.
97. A. Sciambi, D. Goldhaber-Gordon, **S.R. Bank**, and A.C. Gossard, "The Virtual Scanning Tunneling Microscope: A Novel Probe Technique for Imaging Two-Dimensional Electron Systems," *American Physical Society (APS) March Meeting*, Mar. 2008.
98. A.M. Mintairov, K. Sun, J.L. Merz, H. Yuen, **S.R. Bank**, M. Wistey, J.S. Harris, G. Peake, A. Egorov, V. Ustinov, and R.K.J. Misiewicz, "Atomic arrangement and emission properties of GaAs(In,Sb)N dilute nitride quantum wells," *13th Advanced Heterostructures and Nanostructures Workshop (AHNW)*, 2008.
99. M.A. Wistey, G.J. Burek, U. Singiseti, A.M. Crook, B.J. Thibeault, **S.R. Bank**, M.J.W. Rodwell, and A.C. Gossard, "Regrowth of Self-Aligned, Ultra Low Resistance Ohmic Contacts on InGaAs," *International Conf. on Molecular Beam Epitaxy (MBE)*, 2008.
100. M.A. Wistey, U. Singiseti, G.J. Burek, B.J. Thibeault, J. Cagnon, S. Stemmer, **S.R. Bank**, Y. Sun, E.J. Kiewra, D.K. Sadana, A.C. Gossard, and M.J.W. Rodwell, "Self-aligned III-V MOSFETs for sub-22nm Nodes," *SRC Techcon*, 2008.
101. M. Rodwell, E. Lind, Z. Griffith, A.M. Crook, **S.R. Bank**, U. Singiseti, M. Wistey, G. Burek, and A.C. Gossard, "On the Feasibility of few-THz Bipolar Transistors," *Bipolar/BiCMOS Circuits and Technology Meeting, 2007. BCTM '07. IEEE*, p. 17 -21, Sept. 2007.
102. **(Invited) S.R. Bank**, "Towards High Power 1.55- μm GaInNAsSb GaAs-Based Lasers on GaAs," *IEEE/LEOS Semiconductor Laser Workshop*, May 2007.
103. Y. Lin, L.F. Lester, **S.R. Bank**, H.P. Bae, H.B. Yuen, M.A. Wistey, and J.S. Harris, "Monolithic 1.55- μm GaInNAsSb Quantum Well Mode-Locked Lasers," *Conf. on Lasers and Electro Optics (CLEO)*, Baltimore, MD, May 2007.
104. A.C. Gossard, M. Hanson, J. Zide, J. Zimmerman, **S.R. Bank**, E. Brown, and M.J.W. Rodwell, "Metal/semiconductor Heterostructures for Terahertz Applications," *Materials Research Symposium (MRS)*, 2007.
105. E. Pickett, **S.R. Bank**, H. Yuen, H. Bae, T. Sarmiento, A. Marshall, and J.S. Harris, "Thermally Induced Relaxation in GaInNAsSb Quantum Well Structures," *Materials Research Symposium (MRS)*, 2007.
106. **(Plenary)** M. Rodwell, E. Lind, Z. Griffith, **S.R. Bank**, A.M. Crook, U. Singiseti, M. Wistey, G. Burek, and A.C. Gossard, "Frequency limits of InP-based integrated circuits," *19th International Conf. on Indium-Phosphide and Related Materials (IPRM)*, p. 9 -13, 2007.
107. U. Singiseti, A.M. Crook, E. Lind, M.A. Wistey, J.D. Zimmerman, A.C. Gossard, M.J.W. Rodwell, and **S.R. Bank**, "Ultra-Low Resistance Ohmic Contacts to InGaAs/InP," *65th Device Research Conf. (DRC)*, 2007.
108. H.P. Bae, **S.R. Bank**, H.B. Yuen, E.R. Pickett, M.A. Wistey, and J.S. Harris, "Analysis of Relative Speed and Temperature Dependence of Constituent Processes in the Annealing of GaInNAs(Sb)," *48th Electronic Materials Conf. (EMC)*, University Park, PA, June 2006.
109. **S.R. Bank**, H.P. Bae, H.B. Yuen, E.R. Pickett, M.A. Wistey, and J.S. Harris, "Strong Luminescence Enhancement in GaInNAsSb Quantum Wells Through Variation of the Group-V Fluxes," *48th Electronic Materials Conf. (EMC)*, University Park, PA, June 2006.
110. **(Plenary)** A.C. Gossard, M.P. Hanson, J.M.O. Zide, J.D. Zimmerman, and **S.R. Bank**, "Growth and Uses of Metal/Semiconductor Heterostructures," *48th Electronic Materials Conf. (EMC)*, University Park, PA, June 2006.
111. E.R. Pickett, **S.R. Bank**, H.B. Yuen, H.P. Bae, and J.S. Harris, "TEM Analysis of Growth and Annealing Temperature Effects on GaInNAsSb Quantum Wells," *48th Electronic Materials Conf. (EMC)*, University Park, PA, June 2006.

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112. **S.R. Bank**, H.P. Bae, H.B. Yuen, M.A. Wistey, L.L. Goddard, J.S. Harris, R. Kudrawiec, M. Gladysiewicz, M. Motyka, and J. Misiewicz, "Low-Threshold Continuous-Wave 1.55- μm GaInNAsSb lasers," *Conf. on Lasers and Electro Optics (CLEO)*, Long Beach, CA, May 2006.
113. **S.R. Bank**, H.P. Bae, H.B. Yuen, L.L. Goddard, M.A. Wistey, T. Sarmiento, and J.S. Harris, "Low-Threshold CW 1.55- μm GaAs-Based Lasers," *Optical Fiber Communication Conf. (OFC)*, Anaheim, CA, Mar. 2006.
114. **(Invited) S.R. Bank**, "Low-threshold 1.55- μm GaInNAsSb lasers on GaAs," *Rank Prize Funds Symposium*, 2006.
115. **S.R. Bank**, H.P. Bae, L.L. Goddard, H.B. Yuen, M.A. Wistey, and J.S. Harris, "Very Low-Threshold 1.55- μm Dilute-Nitride Lasers," *64th Device Research Conf. (DRC)*, 2006.
116. **S.R. Bank**, U. Singisetti, A.M. Crook, J.D. Zimmerman, J.M.O. Zide, A.C. Gossard, and M.J.W. Rodwell, "MBE Growth of ErAs/In(Ga)As Epitaxial Ultra-Low Resistance Ohmic Contacts," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, 2006.
117. **(Plenary) M. Rodwell, Z. Griffith, N. Parthasarathy, E. Lind, C. Sheldon, S.R. Bank, U. Singisetti, M. Urteaga, K. Shinohara, R. Pierson, and P. Rowell**, "Developing Bipolar Transistors for Sub-mm-Wave Amplifiers and Next-Generation (300 GHz) Digital Circuits," *64th Device Research Conf. (DRC)*, 2006.
118. **S.R. Bank**, H.B. Yuen, H.P. Bae, M.A. Wistey, and J.S. Harris, "MBE Growth of High-Efficiency GaInNAsSb Quantum Wells from 1.45 - 1.55 μm ," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, Keystone, Colorado, Sept. 2005.
119. **S.R. Bank**, H.B. Yuen, M.A. Wistey, V. Lordi, H.P. Bae, and J.S. Harris, "Effects of Growth Temperature on the Optical Behavior of GaInNAsSb Alloys," *47th Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2005.
120. **S.R. Bank**, M.A. Wistey, L.L. Goddard, H.B. Yuen, H.P. Bae, and J.S. Harris, "1.55 μm GaInNAsSb Lasers on GaAs," *Conf. on Lasers and Electro-Optics (CLEO)*, Baltimore, MD, May 2005.
121. L.L. Goddard, **S.R. Bank**, M.A. Wistey, H.B. Yuen, H.P. Bae, and J.S. Harris, "Differential Gain and Nonlinear Gain Compression of GaInNAsSb/GaAs Lasers at 1.5 μm ," *Conf. on Lasers and ElectroOptics (CLEO)*, Baltimore, MD, May 2005.
122. **S.R. Bank**, M.A. Wistey, H.B. Yuen, H.P. Bae, L.L. Goddard, and J.S. Harris, "Defect Modification in GaInNAsSb Growth with Insertion of GaAs Prelayers," *Materials Research Symposium (MRS)*, 2005.
123. L.L. Goddard, **S.R. Bank**, M.A. Wistey, H.B. Yuen, and J.S. Harris, "High performance GaInNAsSb/GaAs lasers at 1.5 μm ," *SPIE Photonics West*, 2005.
124. **S.R. Bank**, M.A. Wistey, H.B. Yuen, L.L. Goddard, H.P. Bae, and J.S. Harris, "MBE Growth of Low Threshold CW GaInNAsSb Lasers at 1.5 μm ," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, Banff, Alberta, Canada, Oct. 2004.
125. **S.R. Bank**, M.A. Wistey, H.B. Yuen, V. Lordi, V.F. Gambin, and J.S. Harris, "Effects of Antimony and Ion Damage on Carrier Localization in MBE-Grown GaInNAs," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, Banff, Alberta, Canada, Oct. 2004.
126. M.A. Wistey, **S.R. Bank**, H.B. Yuen, T. Gugov, and J.S. Harris, "Protecting Wafer Surface During GaInNAs Plasma Ignition by Use of an Arsenic Cap," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, Banff, Alberta, Canada, Oct. 2004.
127. **S.R. Bank**, V. Lordi, M.A. Wistey, H.B. Yuen, and J.S. Harris, "Temperature Dependent Behavior of GaInNAs(Sb) Alloys Grown on GaAs," *46th Electronic Materials Conf. (EMC)*, Notre Dame, IN, June 2004.
128. T. Gugov, V. Gambin, M. Wistey, H. Yuen, **S.R. Bank**, and J.S. Harris, "TEM Structural Characterization of GaInNAs and GaInNAsSb Quantum Wells Grown by Molecular Beam Epitaxy," *46th Electronic Materials Conf. (EMC)*, Notre Dame, IN, June 2004.
129. V. Lordi, **S.R. Bank**, H.B. Yuen, M.A. Wistey, and J.S. Harris, "Electroabsorption and Band Edge Optical Properties of GaInNAsSb Quantum Wells Around 1550nm," *46th Electronic Materials Conf. (EMC)*, Notre Dame, IN, June 2004.
130. M.A. Wistey, **S.R. Bank**, H.B. Yuen, V.F. Gambin, and J.S. Harris, "Low-Voltage Deflection Plates Reduce Plasma Damage in MBE Dilute Nitride Growth," *46th Electronic Materials Conf. (EMC)*, Notre Dame, IN, June 2004.
131. **S.R. Bank**, L.L. Goddard, M.A. Wistey, H.B. Yuen, and J.S. Harris, "The Temperature Sensitivity of 1.5 μm GaInNAsSb Lasers on GaAs," *Conf. on Lasers and Electro-Optics (CLEO)*, May 2004.

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132. L.L. Goddard, **S.R. Bank**, M.A. Wistey, H.B. Yuen, and J.S. Harris, "Measurements of Intrinsic Properties of High Power CW Single Quantum Well GaInNAsSb/GaAs Lasers at 1.5 μm ," *Conf. on Lasers and Electro-Optics (CLEO)*, May 2004.
133. V. Lordi, H.B. Yuen, **S.R. Bank**, M.A. Wistey, and J.S. Harris, "Electroabsorption of GaInNAs and GaInNAsSb quantum wells at 1300 and 1550 nm," *Conf. on Lasers and Electro-Optics (CLEO)*, May 2004.
134. R. Wang, X. Jiang, R.M. Shelby, R.M. Macfarlane, **S.R. Bank**, J.S. Harris, and S.S.P. Parkin, "Spin injection from ferromagnetic tunnel injectors in quantum well structures at high temperatures," *American Physical Society (APS) March Meeting*, Mar. 2004.
135. **S.R. Bank**, M.A. Wistey, H.B. Yuen, L.L. Goddard, and J.S. Harris, "Progress Towards High Power 1.5 μm GaInNAsSb/GaAs Lasers for Raman Amplifiers," *Optical Fiber Communication Conf. (OFC)*, Feb. 2004.
136. **S.R. Bank**, M.A. Wistey, L.L. Goddard, H.B. Yuen, and J.S. Harris, "The Role and Suppression of Carrier Leakage in 1.5 μm GaInNAsSb/GaAs Lasers," *62nd Device Research Conf. (DRC)*, 2004.
137. T. Gugov, M. Wistey, H. Yuen, **S.R. Bank**, and J.S. Harris, "Structural Characterization of Molecular Beam Epitaxy Grown GaInNAs and GaInNAsSb Quantum Wells by Transmission Electron Microscopy," *Materials Research Symposium (MRS)*, 2004.
138. V. Lordi, H.B. Yuen, **S.R. Bank**, M.A. Wistey, and J.S. Harris, "Electroabsorption Properties of GaInNAs(Sb) Quantum Wells at 1300-1600nm," *Materials Research Symposium (MRS)*, 2004.
139. M.A. Wistey, **S.R. Bank**, H.B. Yuen, H. Bae, and J.S. Harris, "Nitrogen Plasma Optimization for High Quality Dilute Nitrides," *International Conf. on Molecular Beam Epitaxy (MBE)*, 2004.
140. H.B. Yuen, **S.R. Bank**, M.A. Wistey, H. Bae, J.S. Harris, and A. Moto, "Effects of N₂ Flow on GaInNAs Grown by a RF Plasma cell in MBE," *Materials Research Symposium (MRS)*, 2004.
141. H.B. Yuen, M.J. Seong, S. Yoon, R. Kudrawiec, **S.R. Bank**, M.A. Wistey, J. Misciewicz, A. Mascarenhas, and J.S. Harris, "Improved Optical Quality from Indium-Free GaNAsSb in the Dilute Sb (<3%) Limit," *Materials Research Symposium (MRS)*, 2004.
142. H.B. Yuen, M.A. Wistey, **S.R. Bank**, H.P. Bae, and J.S. Harris, "Effects of N₂ Flow into a RF Plasma Cell on GaInNAs Grown by MBE," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, 2004.
143. J.X. Fu, **S.R. Bank**, M.A. Wistey, H.B. Yuen, and J.S. Harris, "Solid-Source Molecular-Beam Epitaxy Growth of GaInNAsSb/InGaAs Single Quantum Well on InP with Photoluminescence Peak Wavelength at 2.04 μm ," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, Keystone, CO, Sept. 2003.
144. **S.R. Bank**, M.A. Wistey, H.B. Yuen, L.L. Goddard, and J.S. Harris, "Low Threshold, CW, Room Temperature 1.49 μm GaAs-Based Lasers," *International Symposium on Compound Semiconductors (ISCS)*, San Diego, CA, Aug. 2003.
145. **S.R. Bank**, M.A. Wistey, H.B. Yuen, L.L. Goddard, and J.S. Harris, "Low Threshold, CW, Room Temperature 1.49 μm GaAs-Based Lasers," *61st Device Research Conf. (DRC) Late News*, Salt Lake City, UT, June 2003.
146. **S.R. Bank**, H.B. Yuen, W. Ha, V.F. Gambin, M.A. Wistey, and J.S. Harris, "Strong Photoluminescence Enhancement of 1.3 μm GaInNAs Active Layers by Introduction of Antimony," *45th Electronic Materials Conf. (EMC)*, Salt Lake City, UT, June 2003.
147. H.B. Yuen, **S.R. Bank**, M.A. Wistey, A. Moto, and J.S. Harris, "An Investigation of GaNAs(Sb) for Strain Compensated Active Regions at 1.3 and 1.55 μm ," *45th Electronic Materials Conf. (EMC)*, Salt Lake City, UT, June 2003.
148. D.S. Gardner, **S.R. Bank**, L. Goddard, P. Griffin, J.S. Harris, R. Swanson, and J.R. Patel, "On the Luminescence Efficiency of Silicon Diodes," *Materials Research Society (MRS) Spring Meeting*, San Francisco, CA, Apr. 2003.
149. (*Plenary*) D.S. Gardner, F. Paillet, T. Karnik, R. Swanson, **S.R. Bank**, X. Liu, P. Griffin, J.R. Patel, and J.S. Harris, "Silicon-Based Light Emitting Devices," *The AVS International Conf. on Microelectronics and Interfaces*, 2003.
150. T. Gugov, V. Gambin, M. Wistey, H. Yuen, **S.R. Bank**, and J.S. Harris, "Use of Transmission Electron Microscopy in the Characterization of GaInNAs(Sb) Quantum Well Structures Grown by Molecular Beam Epitaxy," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, 2003.
151. M.A. Wistey, **S.R. Bank**, H.B. Yuen, L.L. Goddard, and J.S. Harris, "Real-Time Ion Count from Nitrogen Plasma Source," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, 2003.
152. H.B. Yuen, V. Lordi, **S.R. Bank**, M.A. Wistey, J.S. Harris, and A. Moto, "Analysis of Material Properties of GaNAs(Sb) Grown by MBE," *Materials Research Symposium (MRS)*, 2003.

CURRICULUM VITAE – SETH ROBERT BANK

153. V. Gambin, V. Lordi, W. Ha, M. Wistey, K. Volz, **S.R. Bank**, H. Yuen, and J. Harris, "High Intensity 1.3—1.6 μm Luminescence and Structural Changes on Anneal from MBE Grown (Ga,In)(N,As,Sb)," *International Conf. on Molecular Beam Epitaxy (MBE)*, San Francisco, CA, Sept. 2002.
154. V. Gambin, W. Ha, M. Wistey, **S.R. Bank**, H. Yuen, S. Kim, and J. Harris, "Long Wavelength, High Efficiency Photoluminescence from MBE Grown GaInNAsSb," *44th Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2002.
155. W. Ha, V. Gambin, **S.R. Bank**, M. Wistey, S. Kim, and J.S. Harris, "Long Wavelength GaInNAs(Sb) Lasers on GaAs," *Conf. on Lasers and Electro-Optics (CLEO)*, Long Beach, CA, May 2002.
156. V. Lordi, V. Gambin, W. Ha, **S.R. Bank**, and J. Harris, "Examination of N Incorporation into GaInNAs," *Materials Research Symposium (MRS)*, April, Apr. 2002.
157. D.S. Gardner, **S.R. Bank**, P. Griffin, J.S. Harris, R. Swanson, and J.R. Patel, "On the Luminescence Efficiency of Silicon Diodes," *Optical Amplification and Stimulation in Silicon (OASIS)*, 2002.
158. W. Ha, V. Gambin, **S.R. Bank**, M. Wistey, J.S. Harris, and S. Kim, "Long wavelength GaInNAs(Sb) lasers on GaAs," *Lasers and Electro-Optics, 2002. CLEO '02. Technical Digest. Summaries of Papers Presented at the*, p. 269 - 270 vol.1, 2002.
159. W. Ha, V. Gambin, **S.R. Bank**, M. Wistey, S. Kim, and J.S. Harris, "A 1.5 μm GaInNAs(Sb) Laser Grown on GaAs by MBE," *60th Device Research Conf. (DRC)*, 2002.
160. W. Ha, V. Gambin, **S.R. Bank**, M. Wistey, S. Kim, and J.S. Harris, "Long Wavelength GaInNAs(Sb) Lasers on GaAs," *14th International Conf. on Indium-Phosphide and Related Materials (IPRM)*, 2002.
161. W. Ha, V. Gambin, **S.R. Bank**, M. Wistey, H. Yuen, L. Goddard, S. Kim, and J.S. Harris, "A 1.5 μm GaInNAs(Sb) Laser Grown on GaAs by MBE," *International Conf. on Molecular Beam Epitaxy (MBE)*, 2002.
162. W. Ha, V. Gambin, **S.R. Bank**, M. Wistey, H. Yuen, S. Kim, and J.S. Harris, "A 1.5 μm GaInNAs(Sb) Laser Grown on GaAs by MBE," *Proc. 18th IEEE International Semiconductor Laser Conf. (ISLC)*, 2002.