

## 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- $\mu\text{m}$  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

Cockrell Family Endowed Chair in Engineering #21 (9/23 – Present)

Cullen Trust for Higher Education Endowed Professorship in Engineering #6 (9/19 – 8/23)

Dads' Association Centennial Teaching Fellowship #1 (1/22 – 5/22)

Temple Foundation Faculty Fellowship No. 5 (9/12 – 8/19)

Professor – Department of Electrical and Computer Engineering (9/18 – Present)

Associate Professor – Department of Electrical and Computer Engineering (9/12 – 8/18)

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 photodiode
    - First demonstration of low multiplication noise from AlInAsSb materials
    - First low-noise III-V avalanche photodiode operating at 1.55  $\mu\text{m}$
    - First digital alloy avalanche photodiode grown on silicon
    - Highest gain low noise InAs avalanche photodiodes
  - Epitaxial regrowth
    - First demonstration of lateral epitaxial overgrowth with planarization with MBE
    - First planar encapsulation of patterned metals with MBE
    - Dark current reduction in epitaxially-regrown detectors
    - Demonstration of novel resonances coupling regrowth with plasmonic n-InAs
  - Nonlinear optical materials
    - First enhancement in interband  $\chi^{(2)}$  with multi-quantum well structures
    - First theoretical prediction of enhancement in interband  $\chi^{(2)}$  with multi-quantum wells
  - Band-anticrossed semiconductors (e.g. dilute-nitride mid-IR lasers and detectors)
    - First bulk long-wave IR with photoresponse beyond InSb (InSbBi nBn & MSM)
    - Longest wavelength GaSb-based diode laser with GaSb barriers
    - Demonstrations of high-quality, droplet-free GaInAsSbBi alloys
  - 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)
  - 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, 2014-2020
    - Revised lecture and (twice) lab components (w/Ed Yu)
    - Introduced Honors section of course beginning in Fall 2018
    - Received Gordon T. Lepley IV Endowed Memorial Teaching Award for this work
    - Received Dads’ Association Centennial Teaching Fellowship to enhance Intro to EE
  - Semiconductor Optoelectronic Devices (graduate) – Sp’2007-2013, 2015, 2017, 2019, 2021, 2022
  - Lasers and Optical Engineering (undergrad/grad) – F’2007, 2008, 2009, 2010, Sp’2016, 2018, 2020, F’2021
- Co-founder and Co-director (w/Deji Akinwande), ECE NEXT undergrad research program (2020 – Present)
  - Industry-funded undergraduate summer research and mentoring program spanning ECE topics
    - Participants paired with research project, as well as faculty and graduate mentors
    - Numerous workshops and activities
  - Support from companies including Google, Meta, Cirrus Logic, Si Labs, Emerson, Qualcomm, National Instruments, Sandia National Laboratories (various years)

**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**
- 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  $\mu\text{m}$ 
  - Demonstrated first continuous-wave (cw) 1.45–1.55  $\mu\text{m}$  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  $\sim 10$  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  $\mu\text{m}$  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  $\mu\text{m}$  (w/Forchel at Würzburg)
  - GaInNAs-based avalanche photodiodes (w/Campbell at UT-Austin)
  - Modelocked lasers at 1.55  $\mu\text{m}$  (w/Lester at U-New Mexico)
  - Hybrid MBE/MOCVD buried heterostructure lasers at 1.55  $\mu\text{m}$  (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**

- Fellow, Optica (formerly OSA, 2023)
- Fellow, IEEE (2022)
- Dads' Association Centennial Teaching Fellowship at UT-Austin (2021-2022)
- Gordon T. Lepley IV Endowed Memorial Teaching Award at UT-Austin (2019-2020)
- A "top reviewer" of Applied Physics Letters for 2017
- 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)
- 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)
- Tau Beta Pi Member (UIUC, 1998)
- Eta Kappa Nu Member (UIUC, 1997)

## **MENTEE HONORS AND AWARDS**

- (Supervisor) North American MBE (NAMBE) Conference Best Student Presentation Award (2023)
- (Supervisor) Electronic Materials Conference (EMC) Student Paper Award (2022)
- (Supervisor) North American MBE (NAMBE) Conference Best Student Presentation Award (2022)
- (Supervisor) Ben Streetman Research Prize (2021)
- (Supervisor) Electronic Materials Conference (EMC) Student Paper Award (2018)
- (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)

## 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
  - 2010 North American Conference on MBE (NAMBE) – Program Chair
- Vice-Chair and related:
  - 2014 IEEE Device Research Conference (DRC) – Technical Vice-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 Photonics Society Annual Meeting (IEEE IPC) – Detection, Sensing, and Energy (2023)
  - Compound Semiconductor Week – Narrow bandgap materials (2022)
  - IEEE International Electron Devices Meeting (IEDM) (2015, 2016)
  - North American Conference on MBE (NAMBE) (2012, 2016)
  - Device Research Conference (DRC) (2011, 2012, 2013)
  - Electronic Materials Conference (EMC) (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, 2017)
    - Formerly Lasers and Electro-Optics Society (LEOS)
  - Photonics Asia – Optoelectronic Devices and Integration (2010)
- Special Symposia:
  - Co-organizer of 50<sup>th</sup> Anniversary of the Semiconductor Laser Symposium, CLEO 2012
  - Co-organizer of Joint Symposium on Hybrid Quantum Nanoplasmonic Systems, CLEO 2011
- Other Conference Organization Duties:
  - DRC Board of Directors (2016-Present)
  - CLEO Steering Committee (IEEE Representative) (2016-2019)
  - 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, 2017)
  - 4th International Workshop on Bismuth Containing Semiconductors (July 2013)
  - Stanford University Photonics Research (SUPR) Career panel participant (April 2012)
  - Army Research Office Electronics Strategy Meeting (Nov. 2011)
  - National Academy of Sciences (NAS) “22<sup>nd</sup> Annual Kavli Frontiers of Science” (Nov. 2010)
  - National Academy of Engineering (NAE) “2010 US Frontiers in Engineering Symposium” (Sept. 2010)
- Professional Society Committees:
  - Ford Foundation Fellowship Evaluator (2022 – Present)
  - Official Nominator for the "Japan Prize" (2017 – Present)

- IEEE Representative to CLEO Steering Committee (2016 – 2019)
- IEEE Photonics Society representative to IEEE Nanotechnology Council (2014 – 2018)
- IEEE Photonics Society Technical Affairs Council (2013 – 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, Physical Review Letters, Scientific Reports, Nature Photonics, AAAS Science Advances
  - Named one of Applied Physics Letters' top reviewers for 2017
- Panels: NSF EPMD Panel (2019), NSF EPMD Panel (2017), NSF DMR Panel (2017), 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: Fellow of IEEE (F'22, SM'11, M'06, S'95), Senior (Life) Member Optica, 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 Int'l Year of Light Family Science Fun Event (2015), NSF/ECCS Broader Impacts Workshop (2016).

#### **ADMINISTRATIVE SERVICE**

- ECE Awards Committee (Fall 2023 – Present)
- Founder and Co-Director of ECE NEXT undergraduate research program (Fall 2020 – Present)
- Co-Chair ECE Committee for Diversity, Equity, and Inclusion (Fall 2020 – Fall 2022)
- ECE Student Mentoring Committee (2020 – 2021)
- Ad Hoc Committee for Lab/Performance Space (2020)
- University Graduate Assembly (2020 – 2021)
- University Admissions & Enrollment Committee (Spring 2020 – 2021)
- Tau Beta Pi Chapter Faculty Advisor (Fall 2019 – Present)
- University Laboratory Safety Committee (2018 – Present)
- University Laser Safety Committee (2018 – Present)
- ECE Senior (FII) Hiring Committee (2017 – 2020)
  - Co-Chair 2018 – 2019 & 2019 – 2020
- 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 – 2016)
- 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

- Advantech Corporation, Beijing, China (10/18)
  - Technical evaluation of photonics startup
- Solar Junction Corporation, San Jose, CA (7/07 – 5/13; 8/18 – 9/19)
  - Informal Technical Advisor (7/07 – 5/13)
  - Consulting expert with respect to ongoing litigation (8/18 – 9/19)
- VecturaLux, Austin, TX (6/11 – 10/11)
  - Co-founder
  - Member of Scientific Advisory Board (6/11 – 10/11)
- ExxonMobil, Houston, TX (9/09 – Present)
  - Development of pressure gradient sensor
- TT electronics / OPTEK Technology, Carrollton, TX (10/07 – 8/08)
  - LED consulting
- EpiWorks, Champaign, IL (8/00 – 9/00)
  - Tech transfer

## PUBLICATION LIST (>450 total, >7000 citations, Hirsch Index = 45)<sup>1</sup>

### PEER-REVIEWED JOURNAL PUBLICATIONS

1. J.A. McArthur, A.A. Dadey, S.D. March, A.H. Jones, X. Xue, R. Salas, J.C. Campbell, and **S.R. Bank**, "[Demonstration of the AlInAsSb Cascaded Multiplier Avalanche Photodiode](#)," *Applied Physics Letters*, vol. 123, no. 4, pp. 041106, July 2023.
2. D. Chen, S.D. March, A.H. Jones, Y. Shen, A.A. Dadey, K. Sun, J.A. McArthur, A.M. Skipper, X. Xue, B. Guo, J. Bai, **S.R. Bank**, and J.C. Campbell, "[Photon-trapping-enhanced avalanche photodiodes for mid-infrared applications](#)," *Nature Photonics*, vol. 17, pp. 594–600, May 2023.
3. A.A. Dadey, J.A. McArthur, A.H. Jones, **S.R. Bank**, and J.C. Campbell, "[Considerations for excess noise measurements of low-k-factor Sb-based avalanche photodiodes](#)," *Journal of the Optical Society of America A*, vol. 40, pp. 1225–1230, May 2023.
4. A.A. Dadey, J.A. McArthur, A. Kamboj, **S.R. Bank**, D. Wasserman, J.C. Campbell, "[High-gain low-excess-noise MWIR detection with a 3.5- \$\mu\text{m}\$  cutoff AlInAsSb-based separate absorption, charge, and multiplication avalanche photodiode](#)," *APL Photonics*, vol. 8, no. 3, pp. 036101, March 2023.
5. R.C. White, L.J. Nordin, A.J. Muhowski, D. Wasserman, and **S.R. Bank**, "[Photoluminescence from InSb<sub>1-x</sub>Bi<sub>x</sub> alloys at extended wavelengths on InSb](#)," *Applied Physics Letters*, vol. 121, no. 19, pp. 191901, Nov. 2022.
6. Q. Meng, R.H. El-Jaroudi, R.C. White, T. Dey, M.S. Reza, **S.R. Bank**, and M.A. Wistey, "[Effects of B and In on the Band Structure of BGa\(In\)As Alloys](#)," *Journal of Applied Physics*, vol. 132, no. 19, pp. 193104, Nov. 2022.
7. T. Dey, M.S. Reza, A. Arbogast, M.W. Holtz, R. Droopad, **S.R. Bank**, and M.A. Wistey, "[Molecular beam epitaxy of highly crystalline GeSnC using CBr<sub>4</sub> at low temperatures](#)," *Applied Physics Letters*, vol. 121, no. 12, pp. 122104, Sept. 2022.
8. H.S. Maczko, R.H. El-Jaroudi, J. Kopaczek, **S.R. Bank**, and R. Kudrawiec, "[Photorefectance studies of the band gap alignments in boron diluted BGaInAs/GaAs quantum wells](#)," *Optical Materials Express*, vol. 12, no. 8, pp. 3118–3131, Aug. 2022.
9. A.H. Jones, S.D. March, A.A. Dadey, A.J. Muhowski, **S.R. Bank**, and J.C. Campbell, "[AlInAsSb Separate Absorption, Charge, and Multiplication Avalanche Photodiodes for Mid-Infrared Detection](#)," *IEEE Journal of Quantum Electronics*, vol. 58, no. 4, Aug. 2022.
10. A.A. Dadey, A.H. Jones, J.A. McArthur, E.Y. Wang, A.J. Muhowski, **S.R. Bank**, and J.C. Campbell, "[Narrow bandgap Al<sub>0.15</sub>In<sub>0.85</sub>As<sub>0.77</sub>Sb<sub>0.23</sub> for mid-infrared photodetectors](#)," *Optics Express*, vol. 30, no. 15, pp. 27285–27292, July 2022.
11. D. Chen, K. Sun, Y. Shen, A.H. Jones, A.A. Dadey, B. Guo, J.A. McArthur, **S.R. Bank**, and J.C. Campbell, "[Frequency behavior of AlInAsSb nBn photodetectors and the development of an equivalent circuit model](#)," *Optics Express*, vol. 30, no. 14, pp. 25262, July 2022.
12. R. Wang, J.A. McArthur, **S.R. Bank**, and J.C. Campbell, "[Infrared Al<sub>0.15</sub>InAsSb digital alloy nBn photodetectors](#)," *Journal of Lightwave Technology*, vol. 40, no. 12, pp. 3855–3863, June 2022.
13. B. Guo, S.Z. Ahmed, X. Xue, A.K. Rockwell, J. Ha, S. Lee, B. Liang, A.H. Jones, J.A. McArthur, S.H. Kodati, T.J. Ronningen, S. Krishna, J.S. Kim, **S.R. Bank**, A.W. Ghosh, and J.C. Campbell, "[Temperature dependence of avalanche breakdown of AlGaAsSb and AlInAsSb avalanche photodiodes](#)," *Journal of Lightwave Technology*, vol. 40, no. 17, pp. 5934–5942, June 2022.
14. N.D. Foster, A.K. Rockwell, B.S. Mendoza, **S.R. Bank**, and M.C. Downer, "[A Study of Second-Order Susceptibility in Digital Alloy-Grown InAs/AlSb Multiple Quantum Wells](#)," *Advanced Optical Materials*, May 2022.
15. R.H. El-Jaroudi, K.M. McNicholas, H.S. Maczko, R. Kudrawiec, and **S.R. Bank**, "[Growth advancement of GaAs-based BGaInAs alloys emitting at 1.3  \$\mu\text{m}\$  by molecular beam epitaxy](#)," *ACS Journal of Crystal Growth & Design*, May 2022.
16. A.M. Skipper, P. Petluru, D.J. Ironside, A.M. Garcia, A.J. Muhowski, D. Wasserman, and **S.R. Bank**, "[All-epitaxial, laterally structured plasmonic materials](#)," *Applied Physics Letters*, vol. 120, no. 16, pp. 161103, Apr. 2022.

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<sup>1</sup> Google Scholar profile from 8/20/2023 (<https://scholar.google.com/citations?user=Ey4P2ywAAAAJ>).

17. **(Invited)** S.D. March, A.H. Jones, A.J. Muhowski, S.J. Maddox, M. Ren, and **S.R. Bank**, "[Digital Alloy Staircase Avalanche Photodetectors with Tunneling-enhanced Gain](#)," *IEEE Journal of Select Topics in Quantum Electronics*, vol. 28, no. 2, pp. 1–13, Mar. 2022.
18. A.J. Muhowski, A. Kamboj, A.F. Briggs, L.J. Nordin, **S.R. Bank**, and D. Wasserman, "[Cascaded InGaSb quantum dot mid-infrared LEDs](#)," *Journal of Applied Physics*, vol. 131, no. 4, Jan. 2022.
19. A.H. Jones, S.D. March, A.A. Dadey, A.J. Muhowski, **S.R. Bank**, and J.C. Campbell, "[AllInAsSb Separate Absorption, Charge, and Multiplication Avalanche Photodiodes for Mid-Infrared Detection](#)," *IEEE Journal of Quantum Electronics*, 2022.
20. R. Wang, D. Chen, J.A. McArthur, X. Xue, A. Jones, **S.R. Bank**, and J.C. Campbell, "[Al<sub>0.3</sub>InAsSb/Al<sub>0.7</sub>InAsSb Digital Alloy nBn Photodetectors](#)," *Journal of Lightwave Technology*, vol. 40, no. 1, pp. 113–120, Jan. 2022.
21. A.J. Muhowski, S.D. March, S.J. Maddox, D. Wasserman, and **S.R. Bank**, "[Minority carrier lifetimes in digitally-grown, narrow-gap AllnAsSb alloys](#)," *Applied Physics Letters*, vol. 119, no. 25, pp. 251102, Dec. 2021.
22. A. Jones, Y. Shen, K. Sun, D. Chen, S. March, **S. Bank**, and J. Campbell, "[Room-temperature bandwidth of 2- \$\mu\$ m AllnAsSb avalanche photodiodes](#)," *Optics Express*, vol. 29, no. 23, pp. 38939–38945, Nov. 2021.
23. J. Kopaczek, F. Dybala, S.J. Zelewski, N. Sokolowski, W. Zuraw, K.M. McNicholas, R.H. El-Jaroudi, R.C. White, **S.R. Bank**, and R. Kudrawiec, "[Photoreflectance studies of temperature and hydrostatic pressure dependencies of direct optical transitions in BGaAs alloys grown on GaP](#)," *Journal of Physics D: Applied Physics*, vol. 55, no. 1, pp. 015107, Oct. 2021.
24. K.M. McNicholas, R.H. El-Jaroudi, and **S.R. Bank**, "[Kinetically Limited Molecular Beam Epitaxy of B<sub>x</sub>Ga<sub>1-x</sub>As Alloys](#)," *Journal of Crystal Growth & Design*, Sept. 2021.
25. D. Chen, J.A. McArthur, S.D. March, X. Xue, A.H. Jones, A.A. Dadey, **S.R. Bank**, and J.C. Campbell, "[Comparison and analysis of Al<sub>0.7</sub>InAsSb avalanche photodiodes with different background doping polarities](#)," *Applied Physics Letters*, vol. 119, no. 3, pp. 032101, July 2021.
26. D. Chen, R. Wang, J.A. McArthur, X. Xue, A.H. Jones, **S.R. Bank**, and J.C. Campbell, "[Demonstration of infrared nBn photodetectors based on the AllnAsSb digital alloy materials system](#)," *Applied Physics Letters*, vol. 119, no. 3, pp. 031101, July 2021.
27. S.D. March, A.H. Jones, J.C. Campbell, and **S.R. Bank**, "[Multistep staircase avalanche photodiodes with extremely low noise and deterministic amplification](#)," *Nature Photonics*, vol. 15, no. 6, pp. 468–474, May 2021.
28. D.J. Ironside, A.M. Skipper, A.M. Garcia, and **S.R. Bank**, "[Review of lateral epitaxial overgrowth of buried dielectric structures for electronics and photonics](#)," *Progress in Quantum Electronics*, vol. 77, pp. 100316, May 2021.
29. Z. Dang, W. Wang, J. Chen, E.S. Walker, **S.R. Bank**, D. Akinwande, Z. Ni, and L. Tao, "[Vis-NIR photodetector with microsecond response enabled by 2D bismuth/Si\(111\) heterojunction](#)," *2D Materials*, vol. 8, no. 3, pp. 035002, Mar. 2021.
30. I.A. Gulyas, C.A. Stephenson, Q. Meng, **S.R. Bank**, and M.A. Wistey, "[The Carbon State in Dilute Germanium Carbides](#)," *Journal of Applied Physics*, vol. 129, no. 5, pp. 055701, Feb. 2021.
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## SELECTED CONFERENCE PRESENTATIONS

1. A.M. Garcia, A.M. Skipper, M.K. Bergthold, and **S.R. Bank**, "SiO<sub>2</sub> Surface Planarization for Selective Area Regrowth of High Aspect Ratio Microstructures," *37th North American Molecular Beam Epitaxy Conf. (NAMBE)*, Madison, WI, Sept. 2023.
2. R.C. White, M.K. Bergthold, T.A. Leonard, A.F. Ricks, D. Wasserman, and **S.R. Bank**, "InSb-Based Dilute-Bismide Alloys Towards Long-Wave Infrared Sensing," *37th North American Molecular Beam Epitaxy Conf. (NAMBE)*, Madison, WI, Sept. 2023.
3. E.Y. Wang, J.A. McArthur, A.A. Dadey, M. Fetters, A.W.K. Liu, J.M. Fastenau, J.C. Campbell, and **S.R. Bank**, "Growth and characterization of Al<sub>x</sub>In<sub>1-x</sub>As<sub>y</sub>Sb<sub>1-y</sub> digital alloys on InP on Si," *65th Electronic Materials Conf. (EMC)*, Santa Barbara, CA, June 2023.
4. R.C. White, M.K. Bergthold, A.J. Muhowski, Y. Wang, I. Okoro, D. Wasserman, and **S.R. Bank**, "Lattice-Matched InAsSbBi Photodetectors for Long-Wave Infrared Sensing," *81st Device Research Conf. (DRC)*, Santa Barbara, CA, June 2023.
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80. N. Nookala, P. Chang, D. Sounas, O. Wolf, S. March, **S. Bank**, I. Brener, A. Alu, and M. Belkin, "Optical Power Limiting from Plasmonic Metasurfaces Coupled to Intersubband Transitions," *IEEE/OSA Conf. on Lasers and Electro Optics (CLEO)*, San Jose, CA, May 2018.
81. K.J. Underwood, A.F. Briggs, S.D. Sifferman, **S.R. Bank**, and J.T. Gopinath, "Auger Recombination in Mid-Infrared Active Regions," *IEEE/OSA Conf. on Lasers and Electro Optics (CLEO)*, San Jose, CA, May 2018.
82. Y. Liu, J. Lee, S. March, N. Nookala, D. Palaferri, O. Wolf, I. Brener, **S. Bank**, and M. Belkin, "Difference-Frequency Generation and Frequency Up-Conversion with Polaritonic Nonlinear Metasurfaces," *IEEE/OSA Conf. on Lasers and Electro Optics (CLEO)*, San Jose, CA, May 2018.
83. B.B. Rajeeva, Z. Wu, A. Briggs, P. Acharya, V. Bahadur, **S. Bank**, and Y. Zheng, "In-situ "Point-and-Shoot" Fabrication of Metallic Rings for Mid-IR/Visible Sensing," *IEEE/OSA Conf. on Lasers and Electro Optics (CLEO)*, San Jose, CA, May 2018.
84. **(Invited) S.R. Bank**, "AllInAsSb avalanche detectors for single photon counting," *SPIE Commercial+ Scientific Sensing and Imaging (SPIE)*, vol. 10212, pp. 1021206, Orlando, FL, Apr. 2018.
85. **(Invited) J.C. Campbell**, O. Pfister, P.A. Beling, and **S.R. Bank**, "Quantum avalanche detection science," *SPIE Commercial+ Scientific Sensing and Imaging (SPIE)*, vol. 10212, pp. 1021206, Orlando, FL, Apr. 2018.
86. **(Invited) S.R. Bank**, "New approaches to the seamless integration of plasmonics, metasurfaces, and dielectric scatters into photonic devices," *Materials Research Symposium (MRS) Fall Meeting*, Boston, MA, Nov. 2017.
87. **(Invited) S.R. Bank**, "New materials approaches to single photon counting with semiconductors," *presented at the NIST Single Photon Counting Workshop*, Boulder, CO, July 2017.
88. **(Invited) S.R. Bank**, "Recent Advances in Low Noise Staircase and Conventional Avalanche Photodiodes," *presented at the 75th Device Research Conf. (DRC)*, South Bend, IN, June 2017.
89. **(Invited) S.R. Bank**, "Alternative materials platform for plasmonic- and metasurface-based devices," *presented at the IEEE-NEMS Conference*, Los Angeles, CA, April 2017.
90. **(Invited) S.R. Bank**, S. J. Maddox, M. Ren, M. Woodson, A.K. Rockwell, J.C. Campbell, "Staircase and Homojunction Avalanche Detectors in InAlAsSb," *presented at the Workshop on Innovative Nanoscale Devices and Systems (WINDS)*, Kohala Coast, Hawaii, Dec. 2016.
91. **(Invited) S.R. Bank**, "Digital Alloy Growth of AllInAsSb for Low Noise Avalanche Photodetectors," *presented at the 5th International Conference and Exhibition on Lasers, Optics & Photonics*, Atlanta, GA, Nov. 2016.
92. 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.
93. 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.

94. **(Invited) S. R. Bank**, S. J. Maddox, A. K. Rockwell, W. Sun, and J.C. Campbell, "Digital Alloy Growth of AlInAsSb for Low Noise Avalanche Photodetectors," 18th International Conference on Crystal Growth and Epitaxy (ICCGE18), Nagoya, Japan, Aug. 2016.
95. 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.
96. **(Received 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.
97. 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 AlInAsSb Digital Alloys on GaSb," *58th Electronic Materials Conf. (EMC)*, Newark, DE, June 2016.
98. 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.
99. **(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.
100. 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.
101. **(Upgraded to Invited) M. Ren**, S. J. Maddox, M. Woodson, Y. Chen, **S.R. Bank**, and J. Campbell, "Low Excess Noise Al<sub>x</sub>In<sub>1-x</sub>As<sub>y</sub>Sb<sub>1-y</sub> (x: 0.3~0.7) Avalanche Photodiodes," IEEE/OSA Conf. on Lasers and Electro Optics (CLEO), San Jose, CA, May 2016.
102. **(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.
103. **(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.
104. 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.
105. **(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.
106. **(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.
107. 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.
108. S.J. Maddox, S.D. March, W. Sun, J.C. Campbell, and **S.R. Bank**, "Growth and Properties of Broadly Tunable AlInAsSb Digital Alloys on GaSb," *57th Electronic Materials Conf. (EMC)*, Columbus, OH, June 2015.
109. 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.
110. 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.
111. 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.
112. E.S. Walker, W. Li, S. Guchair, 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.
113. **(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.
114. 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.

115. 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.
116. 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.
117. 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.
118. **(Received Student Paper Award)** 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.
119. 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.
120. 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.
121. 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.
122. 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.
123. 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.
124. 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.
125. **(Invited) S.R. Bank**, "Epitaxy of terahertz, plasmonic and infrared devices," *2014 Lawrence Symposium of Epitaxy*, Scottsdale, AZ, Feb. 2014.
126. 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.
127. **(Invited) S.R. Bank**, "Recent Advances in InAs Avalanche Photodiodes," *2013 IEEE Photonics Society Conference (IPC)*, Bellevue, WA, Sept. 2013.
128. **(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.
129. **(Received Student Paper Award)** H.P. Nair, R. Salas, N.T. Sheehan, S.J. Maddox, and **S.R. Bank**, "3.4  $\mu\text{m}$  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.
130. 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.
131. 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.
132. 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.
133. 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.
134. 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.

135. 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.
136. 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.
137. 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.
138. 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.
139. 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 monpnictide alloys for tunable epitaxial semimetals," *North American Molecular Beam Epitaxy Conf. (NAMBE)*, Atlanta, GA, Oct. 2012.
140. 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.
141. 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.
142. **(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.
143. 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.
144. 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.
145. 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.
146. 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.
147. 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.
148. 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.
149. 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.
150. 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.
151. 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.
152. **(Received Student Paper Award)** 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.
153. 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.
154. 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.



155. 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.
156. 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.
157. 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.
158. 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.
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160. 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.
161. **(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.
162. 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.
163. **(Invited) S.R. Bank**, "Towards Epitaxial Integration of Metallic Nanostructures into Photonic Device," *SPIE Optics and Photonics Meeting*, San Diego, Ca, Aug. 2011.
164. A.M. Crook, H.P. Nair, 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.
165. 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.
166. 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.
167. 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.
168. R. Salas, E.M. Krivoy, A.M. Crook, H.P. Nair, and **S.R. Bank**, "Compositional Grading of  $\text{In}_x\text{Ga}_{1-x}\text{As}$ /GaAs Tunnel Junctions Enhanced by ErAs Nanoparticles," *Society of Photo-optical Instrumentation Engineers (SPIE) - Optics and Photonics Conference*, San Diego, CA, Aug. 2011.
169. 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.
170. 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.
171. 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.
172. 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.
173. 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.
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