

Fatima Toor, Ph.D.

Assistant Professor, Electrical and Computer Engineering Department
Assistant Professor, Physics and Astronomy Department
Researcher, Optical Science and Technology Center
Affiliate, University of Iowa Informatics Initiative
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The University of Iowa, Iowa City, IA 52242, USA
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Assistant Professor (2014)

Date of First University of Iowa Appointment: August 1, 2014

Primary Department: Electrical and Computer Engineering (ECE)

Secondary Department: College of Liberal Arts and Sciences--Physics & Astronomy

Education

PhD, Princeton University, 2009.

Major: Electrical Engineering - Semiconductor Optoelectronics (Advisor: Claire F. Gmachl)

MA, Princeton University, 2006.

Major: Electrical Engineering (Minor in Physics & Science Technology and Environmental Policy)

BS, Smith College, 2004.

Major: Double Major in Physics and Engineering Science (Advisors: Susan Voss and Malgorzata Pfabe)

Professional Positions

Academic

Postdoctoral Researcher (Manager: Howard Branz), National Renewable Energy Lab. (April 2010 - November 2011).

NSF MRSEC Postdoctoral Fellow (Advisors: Theresa Mayer and Doug Werner), Penn State University. (July 2009 - March 2010).

Graduate Research Assistant, Ph.D. Candidate (Advisor: Claire Gmachl), Princeton University. (August 2004 - June 2009).

Undergraduate Research Assistant - Hearing Research Lab (Advisor: Susan Voss), Smith College. (June 2002 - June 2003).

Undergraduate Research Assistant - Wireless Communication Theory Group (Advisor: Dennis Goeckel), UMass-Amherst. (June 2001 - June 2002).

Industrial

VP of Laser Technology Development, Firefly Photonics LLC. (August 2016 – Present).

Advisor, Advanced Silicon Group (August 2015 – Present).

Research Analyst, Lux Research Inc. (November 2011 - June 2014).

Electrical Engineering Intern (Manager: Ron Nunes), IBM T. J. Watson Research Center. (June 2004 - August 2004).

Electrical Engineering Intern (Manager: Ron Nunes), IBM T. J. Watson Research Center. (June 2003 - August 2003).

Professional Activities

Scientific and Professional Societies

Institute of Electrical and Electronics Engineers (IEEE). (2007 – Present).

Member

Optical Society of America (OSA). (2007 - Present).

Chair of the Laser Systems Technical Group (2016 – Present)

American Physical Society (APS). (2005 – Present).

Member

Sigma Xi Research Society. (2004 – Present).

Member

American Society of Laser Medicine and Surgery (ASLMS). (2017 – Present)

SPIE the international society for optics and photonics. (2017 – Present).

Member

Honors, Prizes, and Awards

Research Innovation and Leadership Finalist - Iowa Women of Innovation Award Nomination, Iowa Technology Association. (2017).

University of Iowa International Programs and the Stanley-UI Foundation Support Organization's International Travel Award (2017).

Rising Star Finalist - Iowa Women of Innovation Award Nomination, Iowa Technology Association. (2016).

40 Under Forty Honoree, Corridor Business Journal. (2016).

Semi-finalist SPIE 2016 Photonics West Start-up Challenge, SPIE. (2016).

Rising Star Finalist - Iowa Women of Innovation Award, Iowa Technology Association. (2015).

Old Gold Summer Fellowship, University of Iowa. (2015).

“2012 Rookie of the Year” Award for Outstanding Science Driven Research, Lux Research. (2013).

APS Energy Research Workshop Fellowship, American Physical Society. (2010).

Advancement of Women in Academic Science and Engineering Careers (ADVANCE) Program Fellowship, National Science Foundation (NSF). (2009).

Deans Fund for Scholarly Travel, Princeton University. (2009).

Materials Research Fellowship worth \$100,000/year for Postdoctoral Research, National Science Foundation (NSF). (2009).

Wu Fund Travel Grant, Princeton University. (2008).

Ocean Optics Inc. Educational Grant, Ocean Optics. (2006).

Sigma Xi Grants-in-Aid of Research Award, Sigma Xi Research Society. (2005).

Adelaide W. Bull Paganelli Prize for Outstanding Work in Physics, Smith College. (2004).

Jean Picker Engineering Program Fellowship, Smith College. (2000-2004).

Adeline D. Penberthy Award for Academic Excellence, Smith College. (2003).

APS/IBM Women in Physics Undergraduate Research Program Award, IBM. (2003).

Deans List, Smith College. (2000-2003).

Jean Picker Engineering Research Grant, Smith College. (2003).

Lewis Leadership Program Fellowship, Smith College. (2003).

SERVICE

Department Service

Officer, ECE Faculty Secretary. (August 2016 – September 2017).

Member, Undergraduate Committee. (August 2014 – Present).

Faculty Mentor, ECE Senior Design Project (August 2016 – Present).

University Service

Committee Member, 2017 Women's Conference University of Iowa. (April 2016 – Present).

Board Member, Women in Science and Engineering Advisory Board, University of Iowa (May 2017 – Present).

Community/State/National/International Service Activities

Community

Judge, Fall Undergraduate Research Festival, Officer. (November 2017).

Chair, All Girls Photonics STEM Camp, Officer. (June 2017).

Chair, All Girls Photonics STEM Camp (funded by the IEEE Photonics Society), Officer. (January 2016).

Judge, Faculty Judge for Project Lead The Way Environmental Sustainability Camp, Officer. (July 2015).

Chair, Solar Camp for for Iowa First Nations Students, Officer. (July 2015).

Co-Chair, Mentoring program for incoming female graduate students in electrical engineering at Princeton University, Officer. (2005 - 2009).

Presenter, Several workshops, competitions, and show-and-tell demonstrations for middle and high school students to promote science and technology at the local New Jersey schools, Officer. (2005 - 2009).

Co-Chair, Women in Science and Engineering (WISE) conference at Princeton University, Officer. (2008).

Co-Chair, Women in Science and Engineering (WISE) conference at Princeton University, Officer. (2006).

International

Chair, OSA Laser Systems Technical Group (March 2016 - March 2019).

One of the two Technical Group Development Chairs on the OSA Board of Meetings (January 2018 - December 2020).

National

U.S. DOE Basic Energy Sciences Grant Reviewer. (October 2016 - Present).

National Science Foundation Grant Reviewer. (March 2016 - Present).

State

Chair, Photonics Camp Organizer at the Young Women in STEM event, Officer. (December 2015).

Student Services

Explore Engineering@Iowa, Other Student Services, Presenter. (February 2018).

Explore Engineering@Iowa, Other Student Services, Presenter. (November 2015).

Explore Engineering@Iowa, Other Student Services, Presenter. (December 2014).

Graduate Student Advising and Committees

PhD Dissertation Supervision Total: 4 students

Alexander Walhof, "Novel III-V Nanowire Photonics" (August 2017 - Present).

Bingtao Gao, "Novel Optoelectronics Utilizing Silicon, III-V, and Organic Materials" (August 2017 – Present).

Amir Asgharzadeh Shishavan, "Bifacial PV Module Performance Modeling" (August 2015 - Present).

Wenqi Duan, "Silicon Nanowire Based Biosensor Development" (August 2015 - Present).

PhD Committee Membership Total: 5 students

Russell Ricker, "Broadband Infrared Wide-Angle Transmissive Interfaces on High-Index Materials" (August 2012 – October 2017).

Sydney Provence, "Next generation mid-wave infrared cascaded light emitting diodes: Growth of broadband, multispectral, and single color devices on GaAs and integrated circuits" (June 2016).

Kevser Sahin Tiras, "Magnetic field effect studies of organic semiconductor devices" (August 2010 – December 2017).

Cuneyt Sahin, "Spin properties of semiconductors, transition metal oxides, topological insulators, and two dimensional systems" (August 2008 - July 2015).

Ruben Llimas, "Curved Spiral Antennas for Underwater Biological Applications" (2010 - May 2015).

MS Thesis Supervision Total: 2 students

1. Lauren Davidson, "Strategies for high efficiency silicon solar cells" (August 2016 – May 2017).
 - Best Undergraduate Poster at the University of Iowa College of Engineering Research Open House, University of Iowa College of Engineering. (2016)
 - Best Graduate Poster at the University of Iowa College of Engineering Research Open House, University of Iowa College of Engineering. (2017)
2. Abby Venable, "Light extraction techniques from IR LEDs" (August 2016 - Present).
 - Winner of the Department of Defense Science, Mathematics, And Research for Transformation (SMART) Defense Education Program scholarship. (2017)

Undergraduate Student Advising and Mentoring

Project Supervision Total: 15 students

1. Aaron Silva, Exploration of the impact of silver nanoparticle plasmon resonance on the optical properties of nano- and micro-textured silicon. (Summer 2017 – Fall 2017)
2. Daniel Kelly, Study the effect of multiscale texturing on the optical properties of silicon. (Fall 2017)
3. Constance Erickson, Optical characterization and midinfrared (MIR) absorption of human and mice healthy and cancerous tissue. (Fall 2017).
4. Thomas Lubenow, Bifacial photovoltaic irradiance profiling using Python. (Fall 2016).
5. Suman Sherwani, Matlab-based Graphical User Interface design of the solar cell model. (Fall 2016).
6. Logan Nichols
 - Silicon nanowire based biosensor design, fabrication, and testing. (Fall 2016 – Summer 2017). 2017 Summer ICRU Fellowship, ICRU.
 - Thermal imaging and analysis of black silicon. (Fall 2015 - Summer 2016).
7. David Wu, Design and testing of an optical endodontic file. (Summer 2016 – Fall 2016).
8. Matthew Thommana, LabVIEW-based data acquisition from a multispecies gas sensor. (Spring 2016 – Summer 2016).
 - 2016 Summer ICRU Fellowship, ICRU.
9. Joshua Larson, Optical design of a compact near-infrared multispecies gas sensor. (Fall 2015 – Summer 2016).
 - 2016 Summer ICRU Fellowship, ICRU. (2016).
10. Ella Wassweiler, Towards the design of high performance IR photonics: Optical analysis of textured gallium antimonide surfaces. (Fall 2015 - Summer 2016).
11. Jason Ryan, LabVIEW-based System design for microwave imaging of the brain. (Spring 2016).
12. Leland Nordin, Novel optical components for ophthalmic imaging. (Summer 2015 - Spring 2016).
 - Noyce Intel Grant, Grinnell College. (2015).
 - Mentored Advanced Project (MAP) funding, Grinnell College. (2015).
13. Lauren Davidson, Design of high efficiency tandem junction solar cells. (Summer 2015).
14. Eric Gansemer, Analytical design of high efficiency tandem junction solar cells. (Spring 2015).
15. Jason Ryan, Automation of the capacitance-voltage (C-V) measurement. (Spring 2015).

Advising

Fall 2017: 21 undergraduate advisees

PUBLICATIONS

Authored Publications

Peer-Reviewed Articles in Technical Journals

1. Lauren Davidson, K A S M Ehteshamul Haque, and Fatima Toor, "Analytical model for simulating thin-film/wafer-based tandem junction solar cells", *Solar Energy*, 150, 287-297, 2017.
2. Chris Deline, Sara MacAlpine, Bill Marion, Fatima Toor, Amir Asgharzadeh, and Joshua S. Stein, "Assessment of Bifacial Photovoltaic Module Power Rating Methodologies – Inside and Out", *IEEE Journal of Photovoltaics*, 7(2), 575-580, 2017.
3. Fatima Toor, Jeffrey Miller, Lauren Davidson, Wenqi Duan, Michael Jura, Joanne Yim, Joanne Forziati, Marcie Black, Review: "Metal Assisted Catalyzed Etch (MACE): Optics and Device Physics", *Nanoscale*, 8, 15448-15466, 2016.
4. Fatima Toor, Jeffrey Miller, Lauren Davidson, Logan Nichols, Wenqi Duan, Michael Jura, Joanne Yim, Joanne Forziati, Marcie Black, Review: "Nanostructured Silicon via Metal Assisted Catalyzed Etch (MACE): Chemistry Fundamentals and Pattern Engineering", *Nanotechnology*, 27(41), 412003, 2016.
5. Ella Wassweiler and Fatima Toor, "Gallium antimonide texturing for enhanced light extraction from infrared optoelectronics devices", *AIP Advances* 6, 065018, 2016.
6. Fatima Toor, Jihun Oh, and Howard M. Branz, "Efficient nanostructured 'black' silicon solar cell by copper-catalyzed metal-assisted etching", *Progress in Photovoltaics*, 23(10), 1375–1380, 2015.
7. Fatima Toor, Todd G. Deutsch, Joel W. Pankow, William Nemeth, Arthur J. Nozik, and Howard M. Branz, "Novel micropixelation strategy to stabilize semiconductor photoelectrodes for solar water splitting systems", *Journal of Physical Chemistry C*, 116 (36), 19262-19267, 2012.
8. Fatima Toor, Howard M. Branz, Matthew R. Page, Kim M. Jones and Hao-Chih Yuan, "Multi-scale surface texture to improve blue response of nanoporous black Si solar cells", *Applied Physics Letters*, 99(10), 103501, 2011.
9. Zhihao Jiang, Seokho Yun, Fatima Toor, Douglas Werner and Theresa Mayer, "Conformal Dual Band Near Perfectly Absorbing Mid-Infrared Metamaterial Coating", *ACS Nano*, 5(6), 4641-4647, 2011.
10. Candice Tsay, Fatima Toor, Claire F. Gmachl and Craig B. Arnold, "Chalcogenide glass waveguides integrated with quantum cascade lasers for on-chip mid-infrared photonic circuit", *Optics Letters*, 35(20), 3324-3326, 2010.
11. Fatima Toor, Scott Howard, Deborah L. Sivco and Claire F. Gmachl, "A compact four-wavelength quantum cascade laser source", *IEEE Journal of Quantum Electronics*, 45 (8), 904-909, 2009.
12. Fatima Toor, Deborah L. Sivco and Claire F. Gmachl, "Temporal wavelength multiplexing of a quantum cascade laser", *Electronics Letters*, 45 (7), 357-359, 2009.
13. Ekua N. Bentil, Fatima Toor, Anthony J. Hoffman, Matthew D. Escarra and Claire F. Gmachl, "Rapid and minimally invasive quantum cascade wafer testing", *IEEE Photonics Technology Letters*, 21 (8), 531- 533, 2009.
14. Nikolai Stelmakh, Michael Vasilyev, Fatima Toor and Claire F. Gmachl, "Degenerate and fully non-degenerate lateral mode patterns in quantum cascade lasers", *Applied Physics Letters*, 94, 013501, 2009.
15. Fatima Toor, Deborah L. Sivco, Hao E. Liu and Claire F. Gmachl, "Effect of waveguide sidewall roughness on the threshold current density and slope efficiency of quantum cascade lasers", *Applied Physics Letters*, 93 (3), 031104, 2008.

Peer-Reviewed Conference Papers

1. Amir Asgharzadeh, Tomas Lubenow, Joseph Sink, Bill Marion, Chris Deline, Clifford Hansen, Joshua Stein,

- Fatima Toor, "Analysis of the Impact of Installation Parameters and System Size on Bifacial Gain and Energy Yield of PV Systems", 44th IEEE PVSC Proceedings, 2017.
2. K A S M Ehteshamul Haque, Wenqi Duan and Fatima Toor, "Extremely Low Reflectivity Nanoporous Black Silicon by Copper Catalyzed Etching for Efficient Solar Cells" 44th IEEE PVSC Proceedings, 2017.
 3. Joshua S. Stein, Daniel Riley, Matthew Lave, Chris Deline, Fatima Toor, "Outdoor Field Performance from Bifacial Photovoltaic Modules and Systems", 44th IEEE PVSC Proceedings, 2017.
 4. Bill Marion, Sara MacAlpine, Chris Deline, Amir Asgharzadeh, Fatima Toor, Daniel Riley, Joshua Stein, Clifford Hansen, "An Irradiance Model for Bifacial PV Modules", 44th IEEE PVSC Proceedings, 2017.
 5. Joshua S. Stein, Daniel Riley, Matthew Lave, Chris Deline, Fatima Toor, Clifford Hansen, "Outdoor Field Performance from Bifacial Photovoltaic Modules and Systems", 33rd EU PVSEC Proceedings, 2017.
 6. Clifford Hansen, Daniel Riley, Matthew Lave, Chris Deline, Amir Asgharzadeh, Fatima Toor, Joshua Stein, "A Detailed Performance Model for Bifacial PV Modules", 33rd EU PVSEC Proceedings, 2017.
 7. K. Zhang, V. Ray, P. Herrera-Fierro, J. Sink, F. Toor, J. Prineas, Selective-area growth of InAs nanowire arrays on Si₃N₄/Si(111) by molecular beam epitaxy, in SPIE Photonics West Quantum Dots and Nanostructures: Growth, Characterization, and Modeling XIV, pp. 10114-45, February 2017.
 8. W. Duan and F. Toor, "Surface characterization of nanostructured 'black silicon' using impedance spectroscopy," in SPIE Optics and Photonics, 2016, pp. 992711-992711-9.
 9. F. Toor, A. C. Guneratne, and M. Temchenko, "Metal-dielectric frequency-selective surface for high performance solar window coatings," in SPIE Photonics West, 2016, pp. 97561S-97561S-6.
 10. F. Toor and A. C. Guneratne, "Modeling refractive metasurfaces in series as a single metasurface," in SPIE Photonics West, 2016, pp. 97560D-97560D-6.
 11. L. Nichols, W. Duan, and F. Toor, "Thermal characterization of nanoporous 'black silicon' surfaces," in SPIE Optics and Photonics, 2016, pp. 99290K-99290K-7.
 12. L. Davidson and F. Toor, "Design optimization of thin-film/wafer-based tandem junction solar cells using analytical modeling," in SPIE Photonics West, 2016, pp. 97430O-97430O-8.
 13. A. Asgharzadeh, L. Nordin, P. Tjossem, M. D. Abramoff, and F. Toor, "PMMA-based ophthalmic contact lens for vision correction of strabismus," in SPIE Optics and Photonics, 2016, pp. 99180C-99180C-8.
 14. C. W. Hansen, J. S. Stein, C. Deline, S. MacAlpine, B. Marion, A. Asgharzadeh, F. Toor, "Analysis of irradiance models for bifacial PV modules," in 2016 IEEE 43rd Photovoltaic Specialists Conference (PVSC), 2016, pp. 0138-0143.
 15. C. Deline, S. MacAlpine, B. Marion, F. Toor, A. Asgharzadeh, and J. S. Stein, "Evaluation and field assessment of bifacial photovoltaic module power rating methodologies," in 2016 IEEE 43rd Photovoltaic Specialists Conference (PVSC), 2016, pp. 3698-3703.
 16. A. Asgharzadeh, E. C. Foresman, and F. Toor, "Performance analysis of crystalline silicon and amorphous silicon photovoltaic systems in Iowa: 2011 to 2014," in 2016 IEEE 43rd Photovoltaic Specialists Conference (PVSC), 2016, pp. 2625-2630.
 17. F. Toor, M. R. Page, H. M. Branz, and H. C. Yuan, "17.1%-Efficient multi-scale-textured black silicon solar cells without dielectric antireflection coating," in 2011 37th IEEE Photovoltaic Specialists Conference, 2011, pp. 000020-000024.
 18. R. Lewicki, A. A. Kosterev, F. Toor, Y. Yao, C. Gmachl, T. Tsai, et al., "Quantum cascade laser absorption spectroscopy of UF₆ at 7.74 μm for analytical uranium enrichment measurements," in SPIE Photonics West, 2010, pp. 76080E-76080E-7.
 19. Z. H. Jiang, S. Yun, F. Toor, D. H. Werner, and T. S. Mayer, "Experimental demonstration of a conformal optical metamaterial absorber," in 2011 IEEE International Symposium on Antennas and Propagation (APSURSI), 2011), 1812-1815.
 20. F. Toor, D. L. Sivco, and C. F. Gmachl, "Effect of waveguide side-wall roughness on the performance of quantum cascade lasers," in SPIE Photonics West, 2009, pp. 72301P-72301P-10.
 21. F. Toor, D. L. Sivco, and C. F. Gmachl, "Temporal wavelength multiplexing of a Quantum Cascade laser," in 2009 IEEE International Conference on Indium Phosphide & Related Materials, 2009, pp. 238-240.
 22. N. M. Stelmakh, M. Vasilyev, F. Toor, and C. Gmachl, "Observation of Degenerate and Non-Degenerate Lateral-Mode Patterns in Mid-IR Quantum Cascade Lasers," in Conference on Lasers and Electro-Optics/International Quantum Electronics Conference, Baltimore, Maryland, 2009, p. JThE14.
 23. E. N. Benti, F. Toor, A. J. Hoffman, M. D. Escarra, and C. F. Gmachl, "Rapid and minimally invasive quantum cascade wafer testing," in SPIE Photonics West, 2009, pp. 72300T-72300T-8.
 24. F. Toor, S. S. Howard, C. F. Gmachl, and D. L. Sivco, "A compact four-wavelength Quantum Cascade laser source," in LEOS 2008 - 21st Annual Meeting of the IEEE Lasers and Electro-Optics Society, 2008, pp. 802-

803.

25. P. Crump, S. Patterson, S. Elim, S. Zhang, M. Bougher, J. Patterson, S. Das, W. Dong, M. Grimshaw, J. Wang, D. Wise, M. DeFranza, J. Bell, J. Farmer, M. DeVito, R. Martinsen, A. Kovsh, F. Toor, and C. F. Gmachl, "Extending the wavelength range of single-emitter diode lasers for medical and sensing applications: 12xx-nm quantum dots, 2000-nm wells, 5000-nm cascade lasers," in SPIE Photonics West, 2007, pp. 64560E-64560E-11.

Presentations

1. Joshua S. Stein, Daniel Riley, Matthew Lave, Chris Deline, Fatima Toor, Clifford Hansen, "Outdoor Field Performance from Bifacial Photovoltaic Modules and Systems", 33rd EU PVSEC, 2017.
2. Clifford Hansen, Daniel Riley, Matthew Lave, Chris Deline, Amir Asgharzadeh, Fatima Toor, Joshua Stein, "A Detailed Performance Model for Bifacial PV Modules", 33rd EU PVSEC, 2017.
3. Amir Asgharzadeh, Tomas Lubenow, Joseph Sink, Bill Marion, Chris Deline, Clifford Hansen, Joshua Stein, Fatima Toor, "Analysis of the Impact of Installation Parameters and System Size on Bifacial Gain and Energy Yield of PV Systems", 44th IEEE PVSC, 2017.
4. K A S M Ehteshamul Haque, Wenqi Duan and Fatima Toor, "Extremely Low Reflectivity Nanoporous Black Silicon by Copper Catalyzed Etching for Efficient Solar Cells" 44th IEEE PVSC, 2017.
5. Joshua S. Stein, Daniel Riley, Matthew Lave, Chris Deline, Fatima Toor, "Outdoor Field Performance from Bifacial Photovoltaic Modules and Systems", 44th IEEE PVSC, 2017.
6. Bill Marion, Sara MacAlpine, Chris Deline, Amir Asgharzadeh, Fatima Toor, Daniel Riley, Joshua Stein, Clifford Hansen, "An Irradiance Model for Bifacial PV Modules", 44th IEEE PVSC, 2017.
7. Fatima Toor, "Impact of Installation Parameters on Bifacial Photovoltaic System Performance" 2017 Photonics North Conference. (Invited speaker)
8. Amir Asgharzadeh, Tomas Lubenow, Joseph Sink, Bill Marion, Chris Deline, Clifford Hansen, Joshua Stein, Fatima Toor, "Impact of Installation Parameters and System Size on Bifacial Gain and Energy Yield of PV Systems", 8th PV Performance Modeling and Monitoring Workshop, 2017.
9. Wenqi Duan, Fatima Toor, "Surface characterization of nanostructured 'black silicon' using impedance spectroscopy", SPIE Optics and Photonics Conference, 2016.
10. Logan Nichols, Wenqi Duan, Fatima Toor, "Thermal characterization of nanoporous 'black silicon' surfaces", SPIE Optics and Photonics Conference, 2016.
11. Amir Asgharzadeh, Leland J. Nordin, Paul J. H. Tjossem, Michael D. Abramoff, Fatima Toor, "PMMA based ophthalmic contact lens for vision correction of strabismus", SPIE Optics and Photonics Conference, 2016.
12. Wenqi Duan, Fatima Toor, Munir Tanas, Ben Miller, Michael Henry, and Mohammed Milhem, "Virtual frozen section assessment of surgical margins in sarcoma resection specimens by Fourier Transform Infrared (FTIR) spectroscopy", 9th Holden Comprehensive Cancer Center Retreat, 2016.
13. Amir Asgharzadeh, Eric Forseman, and Fatima Toor, "Performance Analysis of Photovoltaic Systems Installed at The University of Iowa Humid Continental Climate Zone: Modeling and Measurements from 2011 to 2014.", 43rd IEEE PVSC Conference, 2016.
14. Clifford W. Hansen, Chris Deline, Sara MacAlpine, Bill Marion, Amir Asgharzadeh, Fatima Toor, Joshua S. Stein, "Analysis of Irradiance Models for Bifacial PV Modules.", 43rd IEEE PVSC Conference, 2016.
15. Chris Deline, Sara MacAlpine, Bill Marion, Fatima Toor, Amir Shishavan, and Joshua S. Stein, "Evaluation and Field Assessment of Bifacial Photovoltaic Module Power Rating Methodologies.", 43rd IEEE PVSC Conference, 2016.
16. Lauren Davidson, Fatima Toor, "Design optimization of thin-film/wafer-based tandem junction solar cells using analytical modeling", SPIE OPTO 9743-22, 2016.
17. Fatima Toor, Ananda Carl Guneratne, Marina Temchenko, "Metal-dielectric frequency selective surface for high performance solar window coatings", SPIE OPTO 9756-63, 2016.
18. Fatima Toor, Ananda Carl Guneratne, "Modeling refractive metasurfaces in series as a single metasurface", SPIE OPTO 9756-11, 2016.
19. Amir Asgharzadeh, Eric Forseman, and Fatima Toor, "Performance Analysis of Photovoltaic Systems Installed at The University of Iowa Humid Continental Climate Zone: Modeling and Measurements from 2011 to 2014.", 43rd IEEE PVSC Conference, 2016.
20. Joshua Larson, Fatima Toor, "Optical design of a compact near-infrared multispecies gas sensor," 2016 APS March Meeting, Baltimore, MD. (March 14, 2016).
21. Ella Wassweiler, John Prineas, Fatima Toor, "Towards the design of high performance IR photonics: Optical

- analysis of textured gallium antimonide surfaces," 2016 American Physical Society, Baltimore, MD. (March 14, 2016).
22. Fatima Toor, Ananda Guneratne, Marina Temchenko, "Metal-dielectric frequency selective surface for high performance solar window coatings," 2016 SPIE Photonics West, San Francisco, CA. (February 18th, 2016).
 23. Lauren Davidson, Fatima Toor, "Design optimization of thin-film/wafer-based tandem junction solar cells using analytical modeling," 2016 SPIE Photonics West, San Francisco, CA. (February 16th, 2016).
 24. Fatima Toor, Ananda Guneratne, "Modeling refractive metasurfaces in series as a single metasurface," 2016 SPIE Photonics West, San Francisco, CA. (February 15th, 2016)
 25. Fatima Toor, "High Performance Solar Cells and Coatings using Optical Metamaterials" Optical Science and Technology Center Annual Symposium, University of Iowa, Iowa City, 2015. (Invited)
 26. Ananda Guneratne and Fatima Toor, "Nanostructured Selectively Reflecting Surfaces for Solar Applications", Optical Science and Technology Center Annual Symposium, University of Iowa, Iowa City, 2015.
 27. Jason W. Ryan and Fatima Toor, "Automation of a C-V Measurement System using LabView for Semiconductor Analysis", College of Engineering Research Open House, University of Iowa, Iowa City, 2015
 28. Eric M. Gansemer and Fatima Toor, "Design optimization of a Si/Perovskite Tandem Solar Cell", College of Engineering Research Open House, University of Iowa, Iowa City, 2015.
 29. Ananda Guneratne and Fatima Toor, "Nanostructured Selectively Reflecting Surfaces for Solar Applications", College of Engineering Research Open House, University of Iowa, Iowa City, 2015.
 30. Fatima Toor, "High Performance Optoelectronics for Chemical Sensing and Energy Generation Applications" Spring 2015 Grinnell College Physics Symposium, Grinnell College, Grinnell, Iowa, 2015.
 31. Fatima Toor, "High Performance Optoelectronics for Chemical Sensing Applications", Department of Chemistry Spring Physical and Environmental Seminar Series, Chemistry Department, University of Iowa, Iowa City, 2015. (Invited)
 32. Fatima Toor, "High Performance Optoelectronics for Chemical Sensing and Energy Generation Applications", Fall 2014 Graduate Research Seminar, Electrical and Computer Engineering Department, University of Iowa, Iowa City, 2014.
 33. Fatima Toor, "Engineering Physics for Designing Multi-Colored Light Sources and Detectors", Physics and Astronomy Department, University of Iowa, Iowa City, 2014.
 34. Fatima Toor, "High Performance Optoelectronics for Chemical Sensing and Energy Generation Applications", Optical Science and Technology Center Symposium, University of Iowa, Iowa City, 2014.

Research Presentations (prior to UIowa appointment)

35. Fatima Toor, "\$1/W System Price: How Bifacial Modules will Beat the Needed Efficiency and Cost Targets", Bifacial Photovoltaic Workshop, Chambéry, France, 2014. (Invited)
36. Fatima Toor, "PV Innovation: A Global and Local Perspective", SEMI Texas Fall Outlook, Austin, TX, 2013. (Invited)
37. Fatima Toor, "Innovation as the key solution to surviving in the PV industry shakeout", PV Rollout Conference, Georgia, GA, 2013.
38. Fatima Toor, "Strategies to survive the treacherous PV industry market conditions", PV Japan, Tokyo, Japan, 2012. (Invited)
39. Fatima Toor, "Key issues and innovations in photovoltaic metallization", 2012 Radtech Technical Conference, Chicago, IL, 2012. (Invited)
40. Fatima Toor, "Searching for game changers: sorting through next generation photovoltaic technologies that drive down \$/W", IMAPS NE 39th Symposium and Expo, Marlborough, MA, 2012. (Invited)
41. Fatima Toor, "Opportunities in the turbulent photovoltaic equipment market", Webinar, December 2012.
42. Fatima Toor, "Readying for solar's renaissance: Tomorrow's winners of today's PV innovation", Webinar, June 2012.
43. Jihun Oh, Fatima Toor, Hao-Chih Yuan and Howard Branz, "High efficiency black Si solar cells with no antireflection coating", Proceedings of 21st Workshop on Crystalline Silicon Solar Cells & Modules: Materials and Process, Breckenridge, CO, 2011.
44. Fatima Toor, Matthew R. Page, Howard M. Branz and Hao-Chih Yuan, "17.1%-efficient multi-scale-textured black silicon solar cells without dielectric antireflection coating", 37th IEEE Photovoltaic Specialists Conference, Seattle, WA, 2011.
45. Zhihao Jiang, Seokho Yun, Fatima Toor, Douglas Werner and Theresa Mayer, "Experimental demonstration of a conformal optical metamaterial absorber", IEEE AP-S International Symposium on Antennas and Propagation

- and 2011 USNC/URSI National Radio Science Meeting, Spokane, WA, 2011.
46. Fatima Toor, William B. Nemeth, Matthew R. Page, Qi Wang, Howard M. Branz and Hao-Chih Yuan, "Efficient black silicon solar cells with multi-scale surface texture", 2011 APS March Meeting, Dallas, TX, 2011.
 47. Fatima Toor, Falah Hasoon, Matthew Page, William Nemeth, Qi Wang, Bobby To, Howard Branz, Hao-Chih Yuan, "Optical and electrical characteristics of pyramid-textured black silicon solar cells", MRS Workshop Series Fall 2010 Topic B: Photovoltaic Materials and Manufacturing Issues, Denver, CO, 2010.
 48. Zhihao Jiang, Seokho Yun, Fatima Toor, Douglas Werner and Theresa S. Mayer, "Design, fabrication and characterization of wide-angle polarization-insensitive optical metamaterial absorbers", MRS Fall 2010 Meeting, Boston, MA, 2010.
 49. Zhihao Jiang, Fatima Toor, Seokho Yun, Zikri Bayraktar, Xiande Wang, Douglas Werner, Theresa Mayer and Ping Werner, "Metamaterial absorbers with wide-angle polarization-insensitive multiband properties for RF through mid-infrared applications", Fourth International Congress on Advanced Electromagnetic Materials in Microwaves and Optics, Karlsruhe, Germany, 2010. (Invited)
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