Fatima Toor, Ph.D.

Associate Professor
Electrical and Computer Engineering
Physics and Astronomy
Iowa Technology Institute
Iowa-CREATES and MATFab Facility
Associate Member, Holden Comprehensive Cancer Center – Experimental Therapeutics Program

CV as of April 25, 2021

Campus Address: Electrical and Computer Engineering (ECE), 116 IATL, University of Iowa
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EDUCATION AND PROFESSIONAL HISTORY

Post Graduate Education

2010 - 2011 **Postdoctoral Scholar**, Silicon photovoltaics and photoelectrochemistry, National Renewable Energy Lab, Golden, Co
Mentor(s): Branz, Howard, Deutsch, Todd

2009 - 2010 **Postdoctoral Fellow**, Infrared metamaterials, Pennsylvania State University, State College, PA
Mentor(s): Mayer, Theresa, Werner, Doug

Higher Education

2009 **PhD**, Electrical Engineering - Semiconductor Optoelectronics, Princeton University, Princeton, NJ
Thesis: Spectrally high performing quantum cascade lasers

2006 **MA**, Electrical Engineering, Princeton University, Princeton, NJ
Supporting Areas / Minor: Physics & Science Technology and Environmental Policy)

2004 **BS**, Double Major in Physics and Engineering Science (Advisers: Susan Voss and Malgorzata Pfabe), Smith College, Northampton, MA

Professional and Academic Positions

2020 – Present **Associate Professor,** Electrical and Computer Engineering (100%), Physics and Astronomy (0.025%), Iowa Technology Institute, Iowa CREATES and MATFab facility, Associate Member – Holden Comprehensive Cancer Center Experimental Therapeutics Program, University of Iowa, Iowa City IA (>$3 million in research funding as a PI or Co-PI since 2014)

2021 – 2023 **Elected Member,** University of Iowa Faculty Senate Research Council

2016 - Present **Co-founder, Vice President, and COO**, Firefly Photonics LLC, Coralville, IA

2015 - 2018 **Technology Advisor**, Advanced Silicon Group, Lincoln, MA

2014-2020 **Assistant Professor,** Electrical and Computer Engineering (100%), Physics and Astronomy (0.025%), University of Iowa, Iowa City IA

2011 - 2014 **Research Analyst**, Lux Research Inc., Boston, MA

2004 - 2009 **Graduate Research Assistant, Ph.D. Candidate (Adviser: Claire Gmachl)**, Princeton University, Princeton, NJ

2004 **Electrical Engineering Intern (Manager: Ron Nunes)**, IBM T. J. Watson Research Center, Yorktown Heights, NY

2003 **Electrical Engineering Intern (Manager: Ron Nunes)**, IBM T. J. Watson Research Center, Yorktown Heights, NY

2002 - 2003 **Undergraduate Research Assistant - Hearing Research Lab (Adviser: Susan Voss)**, Smith College, Northampton, MA

2001 - 2002 **Undergraduate Research Assistant - Wireless Communication Theory Group (Adviser: Dennis Goeckel)**, UMass-Amherst, Amherst, MA

Honors and Awards

2020 - Present **Community Champion**, SPIE, the society for optics and photonics technology

2019 - Present **Elected as the Senior Member**, The Optical Society (OSA)

2019 - 2022 **Elected as a Member and Co-Chair**, Natural Sciences and Engineering Research Council of Canada

2019 **Finalist for the Best Student Paper Award**, 46th IEEE Photovoltaics Specialists Conference, Amir Asgharzadeh, Marc Abou Anoma, Adam Hoffman, Chetan Chaudhari, Sushrut Bapat, Richard Perkins, Dan Cohen, Daniel Riley, Fatima Toor, Ben Bourne "A Benchmark and Validation of Bifacial PV Irradiance Models".

2019 **Selected Participant of the US Frontiers of Engineering Innovation Symposium**, National Academy of Engineering, Competitive selection of 100 early-career engineers from industry, universities, and government labs.

2019 **2019 Faculty Startup of the Year Award**, Office of the Vice President of Research

2018 **2018 Outstanding Research Mentor Award**, University of Iowa College of Engineering

2018 **Finalist for the Best Student Paper Award**, 2018 World Conference on Photovoltaic Energy Conversion (WCPEC-7), Amir Asgharzadeh, Chris Deline, Joshua Stein, Fatima Toor, "A Comparison Study of the Performance of South/North-facing vs East/West-facing Bifacial Modules under Diffuse Shading Conditions"

2018 **Finalist for the Best Student Poster Award**, 2018 World Conference on Photovoltaic Energy Conversion (WCPEC-7), Wenqi Duan, Bingtao Gao, K A S M Ehteshamul Haque, and Fatima Toor, "Performance optimization techniques for the front and back of nanostructured 'black silicon' solar cells"

2018 **2018 Best Graduate Poster Award**, 2018 College of Engineering Research Open House, Wenqi Duan, Bingtao Gao, Hui Zhi, Gregory LeFevre, Fatima Toor, "High Sensitivity Silicon Nanowire Biosensor for Estrogen Detection in Water Streams"

2018 **2018 Best Undergraduate Poster Award**, 2018 College of Engineering Research Open House, Joshua Deutsch, Aaron Silva, Fatima Toor, "Mie Scattering based Analytical Model to Compute Plasmon Resonances of Metal Nanoparticles"

2018 **2018 People's Choice Award (3rd out 111 posters)**, 2018 College of Engineering Research Open House, Amir Asgharzadeh Shishavan, Chris Deline, Joshua Stein, Fatima Toor, "Impact of Diffuse Shading Conditions on the Performance of Bifacial PV Modules"

2017 **2017 Research Innovation and Leadership Finalist**, Iowa Technology Association

2017 **2017 University of Iowa International Programs Stanley International Travel Award**, University of Iowa International Programs and Stanley-UI Foundation Support Organization

2016 **Rising Star Finalist - Iowa Women of Innovation Award**, Iowa Technology Association

2016 **40 Under Forty Honoree (based on outstanding research performance)**, Corridor Business Journal

2016 **Semi-finalist SPIE 2016 Photonics West Start-up Challenge**, SPIE

2015 **Rising Star Finalist - Iowa Women of Innovation Award**, Iowa Technology Association

2015 **Old Gold Summer Fellowship**, University of Iowa

2013 **"2012 Rookie of the Year" Award for Outstanding Science Driven Research**, Lux Research, Best performing newly hired research analysts are nominated and voted on by the entire company including international offices.

2010 **APS Energy Research Workshop Fellowship**, American Physical Society, Competitive application process to attend the APS Energy Research Workshop. The fellowship covers the travel and lodging costs to attend the workshop.

2009 - 2010 **Materials Research Fellowship worth $100,000/year for Postdoctoral Research**, National Science Foundation (NSF)

2009 **Advancement of Women in Academic Science and Engineering Careers (ADVANCE) Program Fellowship**, National Science Foundation (NSF), Competitive application process to attend the NSF ADVANCE workshop held at Northeastern University. The fellowship covers the travel and lodging costs to attend the workshop.

2009 **Deans Fund for Scholarly Travel**, Princeton University, Competitve travel fund for

graduate students to travel to conferences.

2008 **Wu Fund Travel Grant**, Princeton University, Competitve travel fund for graduate students to travel to conferences.

2006 **Ocean Optics Inc. Educational Grant**, Ocean Optics, Competitive grant that Ocean Optics, an optical component hardware company, awards for equipment used in teaching labs. I applied for and won this award for the purchase of a spectrometer to teach the lab portion of a course.

2005 **Sigma Xi Grants-in-Aid of Research Award**, Sigma Xi Research Society, Competitive award by the Sigma Xi Research Society for graduate students to perform research. I applied for and won the award to purchase an optical component for my research project.

2004 **Adelaide W. Bull Paganelli Prize for Outstanding Work in Physics**, Smith College, Awarded to top physics undergraduate student at the time of graduation.

2000 - 2004 **Jean Picker Engineering Program Fellowship**, Smith College

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

2003 **APS/IBM Women in Physics Undergraduate Research Program Award**, IBM, Competitive award given to top three female undergraduate summer research interns at IBM.

2003 **Induction to Tau Beta Kappa, Smith's name for the probationary chapter of the National Engineering Honor Society, Tau Beta Pi (TBP)**, Tau Beta Pi National Engineering Honor Society

2003 **Jean Picker Engineering Research Grant**, Smith College

2002 - 2003 **Lewis Leadership Program Fellowship**, Smith College

2001 - 2003 **First Group Scholar (Top 5% of class)**, Smith College

2000 - 2003 **Deans List**, Smith College

Memberships

2017 - Present American Society of Laser Medicine and Surgery

2017 - Present SPIE the international society for optics and photonics

2007 - Present Institute of Electrical and Electronics Engineers

2007 - Present Optical Society of America **(Senior Member)**

2005 - Present American Physical Society

Student Mentoring

PhD - Dissertation Committee Chair

Aug 2020 - Present Keefe, Daniel; Electrical and Computer Engineering, *In Progress*

Sept 2017 - Aug 2021 Gao, Bingtao, Electrical and Computer Engineering, *To be Completed Summer 2021(First position after Ph.D. completion: Postdoctoral Researcher in Deren Yang's group at Zhejian University)*

Aug 2015 - Sept 2020 Duan, Wenqi; Electrical and Computer Engineering, *Completed (First position after Ph.D. completion: New Product Information (NPI) Scientific Writer at Thorlabs Inc.)*

Aug 2015 - June 2019 Asgharzadeh Shishavan, Amir; Electrical and Computer Engineering, *Completed (First position after Ph.D. completion: PV Systems Engineer, NextTracker, Fremont, CA, USA)*

MS - Master's Thesis Committee Chair

Aug 2021 - Present Revelez, Armando; Electrical and Computer Engineering, *In Progress*

Jan 2021 - Present Gorman, Nick; Electrical and Computer Engineering, *In Progress*

Aug 2018 – Sept 2020 Eng, Tori; Electrical and Computer Engineering, *Completed*

Aug 2017 - May 2019 Walhof, Alex; Electrical and Computer Engineering, *Completed (First position after M.S. completion: Full-time Electrical Engineer at Firefly Photonics LLC)*

Aug 2016 - May 2018	Venable, Abby; Electrical and Computer Engineering, *Completed (SMART Graduate Fellowship Recipient, First position after M.S. completion: Electrical Engineer at Missile Defense Agency (Navy))*
Aug 2016 - May 2017	Davidson, Lauren; Electrical and Computer Engineering, *Completed (First position after M.S. completion: Systems Engineer at John Deere)*

PhD - Dissertation Committee Member

2017 - Present	Montealegre, David; Physics and Astronomy, *In progress*
2014 - Present	Askari, Maziyar; Electrical and Computer Engineering, *In progress*
Aug 2013 - Present	Bogh, Cassandra; Physics and Astronomy, *In progress*
2014 - 2021	Quang, Tri; Electrical and Computer Engineering, *Completed*
2014 - 2021	Smith, Rasheid; Pharmaceutical Sciences, *Completed*
2012 - 2020	Wang, Qinghua; Mechanical Engineering, *Completed*
Aug 2014 - Aug 2020	Li, Xinxin; Physics and Astronomy, *Completed*
Aug 2012 - March 2020	Zhang, Kailing; Physics and Astronomy, *Completed*
2013 - 2019	Muhowski, Aaron; Physics and Astronomy, *Completed*
Aug 2012 - Dec 2017	Ricker, Russell; Physics and Astronomy, *Completed*
June 2016	Provence, Sydney; Physics and Astronomy, *Completed*
Aug 2010 - June 2016	Sahin Tiras, Kevser; Physics and Astronomy, *Completed*
Aug 2008 - July 2015	Sahin, Cuneyt; Physics and Astronomy, *Completed*
2010 - May 2015	Llamas, Ruben; Electrical and Computer Engineering, *Completed*

Postdoctoral Research Supervision

Aug 2018 - Present	Dai, Weitao, Jointly advised by Professor John Prineas.
Aug 2017 - May 2018	Kim, Baek Hyun, Jointly advised by Professor John Prineas.

Undergraduate Research Supervision

May 2021 - Present	Edwall, Ryan; Electrical and Computer Engineering, *In progress*
Sept 2020 - Present	Sindt, Jacob; Electrical and Computer Engineering, *In progress (ICRU Fellow Summer 2021)*
Dec 2018 - May 2020	Larson, Eric; Electrical and Computer Engineering, *Completed (ICRU Fellow Summer 2019)*
May 2018 - Aug 2018	Dvorak, Nate; Physics and Mathematics, Coe College, *Completed (NSF GRFP Winner, grad student at UMich)*
May 2018 - Aug 2018	Rost, Oliver; BBA student, *Completed (JPEC fellow Summer 2018)*
May 2018 - Aug 2018	Haider, Olivia; Montana State University Chem Eng *(NSF REU, Summer 2018)*
Jan 2018 - Aug 2018	Dietz, Clarissa; Physics and Astronomy, *Completed (ICRU Fellow Summer 2018) (grad student at UW-Madison)*
Jan 2018 - Sept 2018	Liyanage, Suram; Electrical and Computer Engineering, *Completed (ICRU Fellow Summer 2018)*
Jan 2018 - May 2018	Deutsch, Joshua; Electrical and Computer Engineering, *Completed*
Jan 2018 - May 2018	Lopez, Seth; Electrical and Computer Engineering, *Completed*

May 2017 - May 2018	Silva, Aaron; Biomedical Engineering, *Completed (NSF GRFP Winner, grad student at GA Tech)*
Sept 2017 - Dec 2017	Erickson, Constance; Electrical and Computer Engineering, *Completed*
Sept 2017 - Dec 2017	Kelly, Daniel; Electrical and Computer Engineering, *Completed*
Jan 2017 - May 2017	Bell, Cooper; Electrical and Computer Engineering, *Completed*
Jan 2017 - May 2017	Machlab, Daniel; Electrical and Computer Engineering, *Completed*
Sept 2016 - Dec 2016	Lubenow, Thomas; Electrical and Computer Engineering, *Completed (Software Engineer at Tesla)*
Sept 2016 - Aug 2017	Nichols, Logan; Electrical and Computer Engineering, *Completed (ICRU Fellow Summer 2017) (Full-time Engineer at Firefly Photonics LLC)*
Sept 2016 - Dec 2016	Sherwani, Suman; Electrical and Computer Engineering, *Completed*
June 2016 - Dec 2016	Wu, David; Electrical and Computer Engineering, *Completed*
Jan 2016 - Aug 2016	Thommana, Matthew; Electrical and Computer Engineering, *Completed (ICRU Fellow Summer 2016) (Grad student at GA Tech)*
Sept 2015 - Aug 2016	Larson, Joshua; Electrical and Computer Engineering, *Completed (ICRU Fellow Summer 2016) (Grad student at UCLA)*
Sept 2015 - Aug 2016	Wassweiler, Ella; Electrical and Computer Engineering, *Completed (Grad student at MIT)*
June 2015 - May 2016	Nordin, Leland; Electrical and Computer Engineering, *Completed (Grad student in D. Wasserman's lab at UT-Austin)*
Jan 2015 - May 2015	Gansemer, Eric; Electrical and Computer Engineering, *Completed*
Jan 2015 - May 2016	Ryan, Jason; Electrical and Computer Engineering, *Completed*

SCHOLARSHIP

Publications

Refereed Journal Articles

1. Eric Larson, Madeline Hines, Munir Tanas, Benjamin Miller, Mitchell Coleman, Fatima Toor, "Mid-infrared absorption by soft tissue sarcoma and cell ablation utilizing a mid-infrared interband cascade laser," J. Biomed. Opt. 26(4), 043012 (2021) as part of the Special Issue on Advances in Terahertz Biomedical Science and Applications.

2. Rytlewski, Jeffrey D.; Scalora, Nicholas; Garcia, Keith; Tanas, Munir; **Toor, Fatima**; Miller, Benjamin; Allen, Bryan; Milhem, Mohammed; Monga, Varun. "Photodynamic Therapy Using Hippo Pathway Inhibitor Verteporfin: A Potential Dual Mechanistic Approach in Treatment of Soft Tissue Sarcomas" Cancers 13, no. 4: 675 (2021) as part of the Special Issue on New Directions for Treating Soft Tissue Sarcomas.

3. Xinxin Li, Alexander C. Walhof, Weitao Dai, Ilke Arslan, Yuzi Liu, **Fatima Toor**, and John P. Prineas, "Enhanced radiative and thermal properties from surface encapsulation of InAs nanowires," Opt. Mater. Express 11, 719-728 (2021).

4. Kailing Zhang, Xinxin Li, Alexandar Walhof, Yuzi Liu, **Fatima Toor**, John P. Prineas, "Long Interior Carrier Lifetime in Selective-Area InAs Nanowires on Silicon", OSA Optical Materials Express Vol. 10, Issue 10, pp. 2470-2479 (2020).

5. Avik Samanta, Qinghua Wang, Gurjap Singh, Scott Shaw, **Fatima Toor**, Albert Ratner and Hongtao Ding, "Nanosecond Pulsed Laser Processing Turns Engineering Metals Antireflective and Superwetting", Journal of Manufacturing Processes, Volume 54, Pages 28-37 (2020).

6. Qinghua Wang , Haoxuan You , Zach Lowery , Songwei Li , Hao Fu , Ruoxing Wang , Caterina Lamuta , **Fatima Toor** , Wenzhuo Wu , Albert Ratner , Hongtao Ding, "An Innovative Laser Metasurface Fabrication Technique for Highly Flexible Optoelectronic Devices", J. Micro Nano-Manuf. 19, 1041, 2020.

7. Arthur Onno, Nathan Rodkey, Amir Asgharzadeh, Salman Manzoor, Zhengshan J. Yu, **Fatima Toor**, and Zachary C. Holman, "Predicted power output of silicon-based bifacial tandem photovoltaic systems", Joule, Volume 4, Issue 3, Pages 580-596 (2020).

8. Bingtao Gao, Wenqi Duan, Aaron D. Silva, Alexander C. Walhof, Weitao Dai, and **Fatima Toor**, "Light Management on Silicon utilizing Localized Surface Plasmon Resonance of Electroless Plated Silver Nanoparticles", OSA Optical Materials Express Vol. 9, Issue 9, pp. 3753-3764 (2019).

9. Qinghua Wang, Bingtao Gao, Michaella Raglione, Huixin Wang, Baojia Li, **Fatima Toor**, Mark A. Arnold, and Hongtao Ding, "Review of THz Bandpass Metamaterials: Design, Fabrication, and Modulation", Laser & Photonics Reviews 2019, 1900071.

10. Kailing Zhang, Xinxin Li, Weitao Dai, **Fatima Toor**, John P. Prineas, "Carrier Recombination in the Base, Interior and Surface of InAs/InAlAs Core-Shell Nanowires grown on Silicon", Nano Lett. 2019, 19, 7, 4272-4278.

11. Qinghua Wang, Avik Samanta, **Fatima Toor**, Scott Shaw, Hongtao Ding, "Colorizing Ti-6Al-4V surface via high-throughput laser surface nanostructuring", J. Manufacturing Processes, 43B, 70-75, 2019.

12. Qinghua Wang , Bao-jia Li, **Fatima Toor**, and Hongtao Ding, "Novel laser-based metasurface fabrication process for transparent conducting surfaces", J. Laser Appl. 31, 022505 (2019).

13. Xinxin Li, Kailing Zhang, Julian Treu, Lukas Stampfer, Gregor Koblmueller, **Fatima Toor**, John P. Prineas, "Contactless Optical Characterization of Carrier Dynamics in Free-Standing InAs-InAlAs Core–Shell Nanowires on Silicon", Nano Lett., 2019, 19 (2), pp 990–996.

14. Qinghua Wang, Michaella Raglione, Baojia Li, Xin Jin, **Fatima Toor**, Mark Arnold, Hongtao Ding, "High Throughput Laser Process of Transparent Conducting Surfaces for Terahertz Bandpass Ultrathin Metamaterials", Nature Scientific Reports, 9, 3083 (2019).

15. Rasheid Smith, Wenqi Duan, Juliana Quaterman, Angie Morris, Ceryce Collie, Marcie Black, **Fatima Toor**, Aliasger K. Salem, "Surface modifying doped silicon nanowire based solar cells for applications in biosensing", Adv. Mater. Technol., 1800349, 2018.

16. Wenqi Duan, Bingtao Gao, K A S M Ehteshamul Haque, and **Fatima Toor**, "Performance optimization techniques for the front and back of nanostructured 'black silicon' solar cells", J. of Photonics for Energy, 8(3), 034001, 2018.

17. Amir Asgharzadeh, Bill Marion, Chris Deline, Clifford Hansen, Joshua S. Stein, **Fatima Toor**, "A Sensitivity Study of the Impact of Installation Parameters and System Configuration on the Performance of Bifacial PV Arrays", IEEE Journal of Photovoltaics, 8(3), 798-805, 2018.

18. 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.

19. 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.

20. **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.

21. **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.

22. Ella Wassweiler and **Fatima Toor**, "Gallium antimonide texturing for enhanced light extraction from infrared optoelectronics devices", AIP Advances 6, 065018, 2016.

23. **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.

24. **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.

25. **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.

26. 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. [#]*equal contribution authors*

27. 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.

28. **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.

29. **Fatima Toor**, Deborah L. Sivco and Claire F. Gmachl, "Temporal wavelength multiplexing of a quantum cascade laser", Electronics Letters, 45 (7), 357-359, 2009.

30. 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.

31. 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.

32. **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.

Refereed Book Chapters

1. Toor, F., Duan, W., Gao, B., Black, M. (2019). Metal assisted chemical etching (MACE) based nanostructured silicon solar cells. M. Sakho, E. H. Thomas, S. Wu, J. Kalarikkal, N. Oluwafemi, & O. Samuel (Eds.), *Nanomaterials for Solar Cell Applications*. Elsevier.

Peer-Reviewed Conference Proceedings

1. Qinghua Wang, Bingtao Gao, Fatima Toor, Mark Arnold, and Hongtao Ding, "Laser process of transparent conducting surfaces for terahertz bandpass ultrathin metamaterials", 11268-15, SPIE Photonics West Conference, 2020.
2. John Prineas, Xinxin Li, Kailing Zhang, Aaron Muhowski, and Fatima Toor. "Nanowire and Superlattice Mid-Infrared Emitters on Silicon" (Invited), 2019 IEEE Photonics Society Summer Topical Meeting Series (SUM), 2019.
3. Amir Asgharzadeh, Marc Abou Anoma, Adam Hoffman, Chetan Chaudhari, Sushrut Bapat, Richard Perkins, Dan Cohen, Daniel Riley, Fatima Toor, Ben Bourne "A Benchmark and Validation of Bifacial PV Irradiance Models", 46th IEEE PVSC Proceedings, 2019. Finalist for the Best Student Paper Award
4. Bingtao Gao, Wenqi Duan, Fatima Toor, "Efficiency Improvement of Planar Silicon Solar Cells Utilizing

Localized Surface Plasmon Resonance of Silver Nanoparticles" 46th IEEE PVSC Proceedings, 2019.

5. Amir Asgharzadeh, Chris Deline, Joshua Stein, Fatima Toor, "A Comparison Study of the Performance of South/North-facing vs East/West-facing Bifacial Modules under Diffuse Shading Conditions", 2018 World Conference on Photovoltaic Energy Conversion (WCPEC-7). Finalist for the Best Student Paper Award
6. Wenqi Duan, Bingtao Gao, K A S M Ehteshamul Haque, and Fatima Toor, "Performance optimization techniques for the front and back of nanostructured 'black silicon' solar cells", 2018 World Conference on Photovoltaic Energy Conversion (WCPEC-7). Finalist for the Best Student Poster Award
7. Xinxin Li, Kailing Zhang, Fatima Toor, Gregor Koblmueller, and John P. Prineas, "Radiative and Nonradiative Recombination Coefficients of InAs/InAlAs Core-shell Nanowires" CLEO: Science and Innovations, JW2A. 125, 2018.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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.
13. 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.
14. Chris Deline, Bill Marion, Sara MacAlpine, Josh Stein, Fatima Toor, and Silvana Ayala, "Bifacial PV Performance Models: Comparison and Field Results", BiFiPV 2017 Workshop, 2017.
15. K. Zhang, V. Ray, P. Herrera-Fierro, J. Sink, Fatima Toor, J. Prineas, "Selective-area growth of InAs nanowire arrays on Si3N4/Si(111) by molecular beam epitaxy", SPIE Photonics West, 2017, pp.1011419(1-6).
16. W. Duan and Fatima Toor, "Surface characterization of nanostructured 'black silicon' using impedance spectroscopy," in SPIE Optics and Photonics, 2016, pp. 992711-992711-9.
17. Fatima 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.
18. Fatima Toor and A. C. Guneratne, "Modeling refractive metasurfaces in series as a single metasurface," in SPIE Photonics West, 2016, pp. 97560D-97560D-6.
19. L. Nichols, W. Duan, and Fatima Toor, "Thermal characterization of nanoporous 'black silicon' surfaces," in SPIE Optics and Photonics, 2016, pp. 99290K-99290K-7.
20. L. Davidson and Fatima Toor, "Design optimization of thin-film/wafer-based tandem junction solar cells using analytical modeling," in SPIE Photonics West, 2016, pp. 97430O-97430O-8.
21. A. Asgharzadeh, L. Nordin, P. Tjossem, M. D. Abramoff, and Fatima Toor, "PMMA-based ophthalmic contact lens for vision correction of strabismus," in SPIE Optics and Photonics, 2016, pp. 99180C-99180C-8.
22. C. W. Hansen, J. S. Stein, C. Deline, S. MacAlpine, B. Marion, A. Asgharzadeh, Fatima Toor, "Analysis of irradiance models for bifacial PV modules," in 2016 IEEE 43rd Photovoltaic Specialists Conference (PVSC), 2016, pp. 0138-0143.
23. C. Deline, S. MacAlpine, B. Marion, Fatima 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.
24. A. Asgharzadeh, E. C. Foresman, and Fatima 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.
25. Fatima 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.
26. R. Lewicki, A. A. Kosterev, Fatima 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.
27. Z. H. Jiang, S. Yun, Fatima 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.
28. Fatima 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.
29. Fatima 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.
30. N. M. Stelmakh, M. Vasilyev, Fatima 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.
31. E. N. Bentil, Fatima 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.
32. Fatima 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.
33. 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, Fatima 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.

Editorials

1. **Fatima Toor**, "Biosensor could personalize cancer care", Bio Opinion, Biophotonics Magazine, January 2020.
2. **Fatima Toor**, "Affordable photovoltaic technology at the nexus of energy and water", SPIE Professional Magazine, July 2019.
3. **Fatima Toor**, Stuart Jackson, Xiaoming Shang, Shamsul Arafin, and Haining Yang, "Mid-infrared Lasers for Medical Applications: introduction to the feature issue", OSA Biomedical Optics Express, 9(12), 6255-6257, 2018.
4. **Fatima Toor**, "Design of Si-based tandem photovoltaic modules: path toward commercialization", SPIE Professional Magazine, July 2018.
5. **Fatima Toor**, Arthur Onno, and Karin Hinzer, "Tandem junction solar cells", SPIE Journal of Photonics for Energy, 8(2), 022600, 2018.
6. Shamsul Arafin, **Fatima Toor**, Pengda Hong, and Kaikai Xu, "Near- to mid-IR (1–13 μm) III-V semiconductor lasers: introduction to the feature issue", Applied Optics, 56 (31), NIR1-NIR2, 2017.
7. **Fatima Toor**, "Perovskite solar cell fever", SPIE Professional Magazine, October 2016.

Ph.D. Thesis

1. Toor, F. (2009). *Spectrally high performing quantum cascade lasers*. Princeton University.

Technical Reports

1. Marion, B., MacAlpine, S., Deline, C., Asgharzadeh, A., Toor, F., Riley, D., Stein, J., Hansen, C. (2017). *A Practical Irradiance Model for Bifacial PV Modules: Preprint*. National Renewable Energy Laboratory (NREL), Golden, CO (United States).
2. Deline, C., DiOrio, N., Jordan, D., Toor, F. (2016). *Progress & Frontiers in PV Performance*. NREL (National Renewable Energy Laboratory (NREL), Golden, CO (United States)).

Inventions and Patents

1. Toor, Fatima. 63/034,904, "Compact Laser Scalpel and Method for Preferential Ablation of Tumor Tissue"
2. Toor, Fatima, Prineas, John. 2017-045, "Compact and Low Cost Mid-Infrared Quantum Cascade Laser-Based Scalpel for Tissue Excision and Tumor Ablation"
3. Prineas, John, Boggess, Thomas, Toor, Fatima. 62/532,839, "High-Power Infrared Light- Emitting Diodes, Detectors, and Lasers"
4. Boggess, Thomas, Muhowski, Aaron, Prineas, John, Ricker, Russell, Toor, Fatima. 62/632,296, "Method for Achieving High Brightness Mid- Infrared Light Emitting Diode Arrays Made From 6.1 Å Semiconductors such as InAs, GaSb, AlSb, and Their Alloys"
5. Guneratne, Ananda, Jin, Xin, Toor, Fatima. 62/292,832, "Frequency Selective Surface for High-Performance Solar Coatings for Reduced Energy Consumption in Buildings"
6. Drake, David, Goree, John, Morio, Kimberly, Toor, Fatima. 62/245,624, "Microfiber Optic System for Elimination of Viable Microorganisms", 62/245,624

62/359,569

7. Coleman, Mitchell, Toor, Fatima. 2016-151, "Infrared Quantum Cascade Laserbased Arthroscope for Diagnosis of Pre- Degenerative Osteoarthritis"
8. Toor, Fatima, Abramoff, Michael, Nordin, Leland, Tjossem, Paul. 2016-065, "PMMA-Based Ophthalmic Contact Lens for Prismatic Vision Correction of Esotropia"
9. Black, Marcie, Toor, Fatima, Salem, Aliasger. 15/243,099, "Optoelectronic cartridge for cancer biomarker detection utilizing silicon nanowire arrays"
10. Toor, Fatima, Davidson, Lauren. TXu 2-010-968, "MATLAB Based Analytical Model for Designing Tandem Junction Solar Cells"
11. Guneratne, Ananda, Toor, Fatima. 2015-146, "3D printed light trapping encapsulation films for solar cells"
12. Toor, Fatima, Abramoff, Michael, Guneratne, Ananda. 2015-063, "Nanostructured Metasurface Lenses for Wide- Field Retinal Imaging"
13. Toor, Fatima. 2015-064, "Novel Tandem Photovoltaic Solar Cell Structure: Nanostructured 'black Si' and Perovskite Absorbers"
14. Toor, Fatima, Salem, Aliasger. 2015-145, "OPTOelectronics and Pharmaceutics for On-demand Drug release (OPTOPOD)"
15. Sen Gupta, Ananya, Toor, Fatima. 2015-141, "Toxin Hounds: A Smart Sensor Approach to Air Quality Monitoring"
16. 8,815,104, "Copper-assisted, antireflection etching of silicon surfaces"

Conference Presentations

Research Presentations (since UIowa appointment)

1. Kevser Sahin Tiras, Markus Wohlgenannt, **Fatima Toor**, "Comparison of deposition techniques for hybrid perovskite solar cells", Bulletin of the American Physical Society, 2021/3/17.
2. Jacob Sindt and **Fatima Toor**, "Ray Optics Modeling to Determine the Effect of Light Trapping Coatings on Solar Cell Efficiency", College of Engineering Research Open House, University of Iowa, Iowa City, 2020.
3. Dan Keefe, Bingtao Gao, Anthony Rojas Chavez, Rasheid Smith, Hillel Haim, Aliasger Salem, and **Fatima Toor**, "Rapid and Inexpensive Biosensor for Sensitive and Selective Detection of COVID-19", College of Engineering Research Open House, University of Iowa, Iowa City, 2020.
4. Amir Asgharzadeh, Marc Abou Anoma, Adam Hoffman, Chetan Chaudhari, Sushrut Bapat, Richard Perkins, Dan Cohen, Daniel Riley, **Fatima Toor**, Ben Bourne "A Benchmark and Validation of Bifacial PV Irradiance Models", 46th IEEE PVSC Proceedings, 2019. *Finalist for the Best Student Paper Award*
5. Bingtao Gao, Wenqi Duan, **Fatima Toor**, "Efficiency Improvement of Planar Silicon Solar Cells Utilizing Localized Surface Plasmon Resonance of Silver Nanoparticles" 46th IEEE PVSC Proceedings, 2019.
6. Haoxuan You, Zach Lowery, Qinghua Wang, Ruoxing Wang, Caterina Lamuta, **Fatima Toor**, Wenzhuo Wu, Albert Ratner, and Hongtao Ding, "A Novel Laser Patterning Process for Highly Flexible Transparent Conducting Heater", 3rd World Congress on Micro and Nano Manufacturing, 2019.
7. Qinghua Wang, Caterina Lamuta, **Fatima Toor**, Mark Arnold, Hongtao Ding, "Laser-based Metamaterial Fabrication of Flexible THz Optics", 56th Annual Technical Meeting of the Society of Engineering Science (SES2019) Conference, 2019.
8. Qinghua Wang, Michaella Raglione, Huixin Wang, **Fatima Toor**, Mark A. Arnold, and Hongtao Ding, "A Novel Laser-based Metasurface Fabrication Method for Tunable THz Bandpass Optics", 14th Internationl Manufacturing Science and Engineering Conference (MSEC) by ASME, 2019.
9. Qinghua Wang, Avik Samanta, Scott K. Shaw, **Fatima Toor**, and Hongtao Ding, "Colorizing Hydrophobic Ti-6Al-4V Surface via High-Throughput Laser Surface Nanostructuring", 47th North American Manufacturing Research Conference (NAMRC 47), 2019.
10. Avik Samanta, Qinghua Wang, Gurjap Singh, Scott Shaw, **Fatima Toor**, Albert Ratner and Hongtao Ding, "Nanosecond Pulsed Laser Processing Turns Engineering Metals Antireflective and Superwetting", 47th North American Manufacturing Research Conference (NAMRC 47), 2019.
11. Amir Asgharzadeh, Chris Deline, Joshua Stein, **Fatima Toor**, "A Comparison Study of the Performance of South/North-facing vs East/West-facing Bifacial Modules under Diffuse Shading Conditions", 2018 World Conference on Photovoltaic Energy Conversion (WCPEC-7). *Finalist for the Best Student Paper Award*
12. Wenqi Duan, Bingtao Gao, K A S M Ehteshamul Haque, and **Fatima Toor**, "Performance optimization techniques for the front and back of nanostructured ‘black silicon’ solar cells", 2018 World Conference on

Photovoltaic Energy Conversion (WCPEC-7). *Finalist for the Best Student Poster Award*

13. Xinxin Li, K. Zhang, J. Treu, L. Stampfer, G. Koblmueller, **F. Toor**, J.P. Prineas, "InAs NWs on Si(111) Substrate for Infrared Light Emitting Diodes", MIOMD4-MoA9, 14th International Conference on Mid-IR Optoelectronics: Materials and Devices MIOMD-XIV, 2018.
14. Xinxin Li, Kailing Zhang, **Fatima Toor**, Gregor Koblmueller, and John P. Prineas, "Radiative and Nonradiative Recombination Coefficients of InAs/InAlAs Core-shell Nanowires" CLEO: Science and Innovations, JW2A. 125, 2018.
15. Qinghua Wang, Bao-jia Li, **Fatima Toor**, Hongtao Ding, "A novel laser-based metasurface fabrication (LMF) process for transparent conducting surfaces", Paper # M303, The International Congress on Applications of Lasers & Electro-Optics (ICALEO), 2018.
16. Wenqi Duan, Bingtao Gao, Hui Zhi, Gregory LeFevre, **Fatima Toor**, "High Sensitivity Silicon Nanowire Biosensor for Estrogen Detection in Water Streams", College of Engineering Research Open House, University of Iowa, Iowa City, 2018 - *Winner of the Best Graduate Poster Award!*
17. Joshua Deutsch, Aaron Silva, **Fatima Toor**, "Mie Scattering based Analytical Model to Compute Plasmon Resonances of Metal Nanoparticles", College of Engineering Research Open House, University of Iowa, Iowa City, 2018 - *Winner of the Best Undergraduate Poster Award!*
18. Amir Asgharzadeh Shishavan, Chris Deline, Joshua Stein, **Fatima Toor**, "Impact of Diffuse Shading Conditions on the Performance of Bifacial PV Modules", College of Engineering Research Open House, University of Iowa, Iowa City, 2018 - *Winner of the People's Choice Poster Award (3rd place out of 111 posters)*
19. Aaron Silva, Wenqi Duan, **Fatima Toor**, "Enhanced Absorption of Nano-Textured Silicon through Silver Nanoparticle Decoration", College of Engineering Research Open House, University of Iowa, Iowa City, 2018.
20. Alex Walhof, Kailing Zhang, John Prineas, **Fatima Toor**, "InAs Nanowires for Infrared Optics: Selective Area Epitaxy Growth and Capacitance-Voltage Devices", College of Engineering Research Open House, University of Iowa, Iowa City, 2018.
21. Bingtao Gao, Wenqi Duan, **Fatima Toor**, "Electrical and Optical Performance Optimization of Nanostructured "Black Silicon" Solar Cells", College of Engineering Research Open House, University of Iowa, Iowa City, 2018.
22. Clarissa Dietz*, Wenqi Duan, **Fatima Toor**, "Sol-gel films for biosensors:Process Development and Characterization of Morphology and Optical Properties"
23. Seth Lopez,* Jianchao Xu*, Bingtao Gao, Scott Shaw, **Fatima Toor**, "Exploring Electronic Properties of Ionic Liquids to Improve Components in Solar Cells, Organic Light Emitting Diodes, and Optical Sensors", College of Engineering Research Open House, University of Iowa, Iowa City, 2018.
24. Suram Liyanage*, Constance Erickson*, Rebecca Dodd, Munir Tanas, Ben Miller, **Fatima Toor**, "Analysis of Human and Animal Soft Tissue Sarcoma in the Mid-infrared utilizing an FTIR Spectrometer", College of Engineering Research Open House, University of Iowa, Iowa City, 2018.
25. Xin Jin, **Fatima Toor**, "Development of a broadband visible spectrum metal-dielectric metamaterial film for solar window coating applications", College of Engineering Research Open House, University of Iowa, Iowa City, 2018.
26. Hansen, C. W., Gooding, R., Guay, N., Riley, D. M., Kallickal, J., Ellibee, D., Asgharzadeh, A., Marion, B., **Toor, F.**, Stein, J. S. (2017). A detailed model of rear-side irradiance for bifacial PV modules. 2017 IEEE Photovoltaics Specialists Conference., Washington DC, USA.
27. Asgharzadeh, A., Lubenow, T., Sink, J., Marion, B., Deline, C., Hansen, C., Stein, J., **Toor, F.** (2017). Analysis of the Impact of Installation Parameters and System Size on Bifacial Gain and Energy Yield of PV Systems. 2017 IEEE 44th Photovoltaic Specialists Conference (PVSC), Washington DC, USA.
28. Stein, J. S., Riley, D., Lave, M., Hansen, C., Deline, C., **Toor, F.** (2017). Outdoor Field Performance from Bifacial Photovoltaic Modules and Systems. 44th IEEE Photovoltaic Specialist Conference, Washington DC, USA.
29. 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.
30. 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.
31. Zhang, K., Ray, V., Herrera-Fierro, P., Sink, JR, **Toor, F.**, Prineas, J. (2017). Selective-area growth of InAs nanowire arrays on Si3N4/Si (111) by molecular beam epitaxy. Quantum Dots and Nanostructures: Growth, Characterization, and Modeling XIV (vol. 10114, pp. 1011419).
32. Wenqi Duan, **Fatima Toor**, "Surface characterization of nanostructured 'black silicon' using impedance spectroscopy", SPIE Optics and Photonics Conference, 2016.
33. Logan Nichols, Wenqi Duan, **Fatima Toor**, "Thermal characterization of nanoporous 'black silicon' surfaces",

SPIE Optics and Photonics Conference, 2016.

34. Amir Asgharzadeh, Leland J. Nordin, Paul J. H. Tjossem, Michael D. Abràmoff, **Fatima Toor**, "PMMA based ophthalmic contact lens for vision correction of strabismus", SPIE Optics and Photonics Conference, 2016.
35. 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.
36. 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.
37. 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.
38. 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.
39. Lauren Davidson, **Fatima Toor**, "Design optimization of thin-film/wafer-based tandem junction solar cells using analytical modeling", SPIE OPTO 9743-22, 2016.
40. **Fatima Toor**, Ananda Carl Guneratne, Marina Temchenko, "Metal-dielectric frequency selective surface for high performance solar window coatings", SPIE OPTO 9756-63, 2016.
41. **Fatima Toor**, Ananda Carl Guneratne, "Modeling refractive metasurfaces in series as a single metasurface", SPIE OPTO 9756-11, 2016.
42. 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.
43. Joshua Larson, **Fatima Toor**, "Optical design of a compact near-infrared multispecies gas sensor," 2016 APS March Meeting, Baltimore, MD. (March 14, 2016).
44. 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).
45. **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).
46. 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).
47. **Fatima Toor**, Ananda Guneratne, "Modeling refractive metasurfaces in series as a single metasurface," 2016 SPIE Photonics West, San Francisco, CA. (February 15th, 2016)
48. **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)
49. 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.
50. 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
51. 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.
52. Ananda Guneratne and **Fatima Toor**, “Nanostructured Selectively Reflecting Surfaces for Solar Applications”, College of Engineering Research Open House, University of Iowa, Iowa City, 2015.
53. **Fatima Toor**, “High Performance Optoelectronics for Chemical Sensing and Energy Generation Applications” Spring 2015 Grinnell College Physics Symposium, Grinnell College, Grinnell, Iowa, 2015.
54. **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)
55. **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.
56. **Fatima Toor**, “Engineering Physics for Designing Multi-Colored Light Sources and Detectors”, Physics and Astronomy Department, University of Iowa, Iowa City, 2014.
57. **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)

50. **Fatima Toor**, "$1/W System Price: How Bifacial Modules will Beat the Needed Efficiency and Cost Targets", Bifacial Photovoltaic Workshop, Chambery, France, 2014. (Invited)
51. **Fatima Toor,** "PV Innovation: A Global and Local Perspective", SEMI Texas Fall Outlook, Austin, TX, 2013. (Invited)
52. **Fatima Toor**, "Innovation as the key solution to surviving in the PV industry shakeout", PV Rollout Conference, Georgia, GA, 2013.
53. **Fatima Toor**, "Strategies to survive the treacherous PV industry market conditions", PV Japan, Tokyo, Japan, 2012. (Invited)
54. **Fatima Toor**, "Key issues and innovations in photovoltaic metallization", 2012 Radtech Technical Conference, Chicago, IL, 2012. (Invited)
55. **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)
56. **Fatima Toor**, "Opportunities in the turbulent photovoltaic equipment market", Webinar, December 2012.
57. **Fatima Toor**, "Readying for solar's renaissance: Tomorrow's winners of today's PV innovation", Webinar, June 2012.
58. 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.
59. **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.
60. 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.
61. **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.
62. **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.
63. 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.
64. 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)
65. Rafal Lewicki, Anatoliy Kosterev, **Fatima Toor**, Yu Yao, Claire Gmachl, Xiaojun Wang, Mary Fong, Frank K. Tittel "Laser absorption spectroscopy based on a 7.74 μm quantum cascade laser source for UF_6 analytical enrichment measurements", SPIE Photonics West Conference, San Francisco, CA, 2010.
66. **Fatima Toor**, Scott Howard, Deborah L. Sivco and Claire F. Gmachl "Four-wavelength quantum cascade laser source for compact medical and environmental sensors", Bernard M. Gordon Center for Subsurface Sensing and Imaging Systems Research and Industrial Collaboration Conference, Northeastern University, Boston, MA, 2009.
67. **Fatima Toor**, Deborah L. Sivco and Claire F. Gmachl, "Temporal wavelength multiplexing of a quantum cascade laser", Indium Phosphide and Related Materials (IPRM) Conference, Newport Beach, CA, 2009.
68. Nikolai Stelmakh, Michael Vasilyev, **Fatima Toor** and Claire F. Gmachl, "Degenerate and non-degenerate lateral mode patterns in mid-IR quantum cascade lasers", CLEO/QELS Conference, Baltimore, MD, 2009.
69. **Fatima Toor**, Deborah L. Sivco and Claire F. Gmachl, "Temporal wavelength multiplexing of a quantum cascade laser", APS March Meeting, Pittsburgh, PA, 2009.
70. **Fatima Toor**, Deborah L. Sivco and Claire F. Gmachl, "Effect of waveguide side-wall roughness on the performance of quantum cascade lasers", SPIE Photonics West, San Jose, CA, 2009.
71. Ekua N. Bentil, **Fatima Toor**, Anthony J. Hoffman, Matthew D. Escarra and Claire F. Gmachl, "Rapid and minimally invasive quantum cascade wafer testing", SPIE Photonics West, San Jose, CA, 2009.
72. Nikolai Stelmakh, Michael Vasilyev, **Fatima Toor** and Claire F. Gmach, "Lateral mode structure of wide-ridge

quantum cascade lasers", 39th Winter Colloquium of the Physics of Quantum Electronics, Snowbird, UT, 2009.

73. **Fatima Toor**, Scott Howard, Deborah L. Sivco, and Claire F. Gmachl, "A compact four-wavelength quantum cascade laser source", IEEE LEOS Meeting, New Port Beach, CA, 2008.
74. Ekua N. Bentil, **Fatima Toor**, Anthony Hoffman and Claire F. Gmachl, "Quantum cascade laser wafer testing using intersubband optical absorption and emission spectroscopy", International Quantum Cascade Lasers School & Workshop, Monte Verita, Switzerland, 2008.
75. **Fatima Toor**, Deborah L. Sivco and Claire F. Gmachl, "Effects of waveguide side-wall roughness on quantum cascade laser performance", MIRTHE Summer School, Johns Hopkins University, Baltimore, MD, 2008.
76. Ekua N. Bentil, **Fatima Toor**, Anthony J. Hoffman, Matthew D. Escarra and Claire F. Gmachl, "Rapid and minimally invasive quantum cascade wafer testing", MIRTHE Summer School, Johns Hopkins University, Baltimore, MD, 2008.
77. **Fatima Toor**, Hao E. Liu, Deborah L. Sivco and Claire F. Gmachl, "Effects of waveguide side-wall roughness on quantum cascade laser performance", APS March Meeting, New Orleans, LA, 2008.
78. **Fatima Toor**, Scott S. Howard, Deborah L. Sivco and Claire F. Gmachl**,** "Four-wavelength quantum cascade laser source for compact spectroscopic systems", APS March Meeting, New Orleans, LA, 2008.
79. **Fatima Toor**, Scott S. Howard, Deborah L. Sivco and Claire F. Gmachl**,** "Four-wavelength quantum cascade laser source for compact spectroscopic systems", PRISM/PCCM/MIRTHE/CNSA Symposium, Princeton, NJ, 2008.
80. Ekua N. Bentil, **Fatima Toor**, Zhijun Liu and Claire F. Gmachl, "Quantum cascade laser wafer testing using intersubband optical absorption and emission spectroscopy", PRISM/PCCM/MIRTHE/CNSA Symposium, Princeton, NJ, 2008.
81. **Fatima Toor**, Scott S. Howard, Deborah L. Sivco and Claire F. Gmachl, "Four-wavelength quantum cascade laser source for compact spectroscopic systems", MIRTHE Summer School, Princeton University, Princeton, NJ, 2007.
82. **Fatima Toor**, Kale Franz, Anthony Hoffman, Scott Howard, Daniel Wasserman, Claire Gmachl, Kuen-Ting Shiu, Stephen R. Forrest, Alexey Belyanin and Deborah .L. Sivco, "Novel QC laser designs for multi-wavelength operation: (i) Difference Frequency Generation (DFG), (ii) Dual Active Cores, and (iii) Cascaded QC lasers", PRISM/PCCM/MIRTHE Symposium, Princeton, NJ, 2007.
83. **Fatima Toor**, Yves Martin, Theodore Van Kessel and Matthew Colburn, "Imprint Lithography", IBM Co-op Research Symposium, IBM T.J. Watson Research Labs, Yorktown Heights, NY, 2004.
84. **Fatima Toor**, Dominick Posillico and Ron Nunes, "Process Optimization for Negative Photoresists", IBM Co-op Research Symposium, IBM T.J. Watson Research Labs, Yorktown Heights, NY, 2003.

SERVICE

Profession

2021 - Present	SPIE the international society for optics and photonics, Publications Committee, Member
2020 - Present	U.S. DOE Technology Commercialization Fund, Reviewer, Grant Proposals
2019 - Present	Natural Sciences and Engineering Research Council of Canada, Discovery Grants (Member, Electrical Engineering Subgroup), Reviewer, Grant Proposals
2018 - Present	SPIE the international society for optics and photonics, Associate Editor SPIE Journal of Photonics for Energy, Editorial Board
2016 - Present	U.S. DOE Basic Energy Sciences, Reviewer, Grant Proposals
2016 - Present	National Science Foundation, EPMD, STTR, SBIR, IIBR, HDR-DRISE, Reviewer, Grant Proposals
2008 - Present	APS, SPIE, IEEE, ACS, MRS, Reviewer, Publications, Reviewer for Physica Status Solidi A: Applications and Materials Science, Langmuir, IEEE Journal of Photovoltaics, ACS Journal of Applied Electrochemistry, Progress in Photovoltaics, OSA Optics Express, OSA Biomedical Optics Express, SPIE Journal of Photonics for Energy, Solar Energy, RSC Energy & Environmental Science, Journal of Applied Physics D, Semiconductor Science and Technology Journal, Superlattices and Microstructures Journal
2018 - 2020	Optical Society of America, Technical Group Development Chair, Board of Directors
2018 - 2019	University of Iowa Solar Car Team, Board of Advisors
2018 - 2019	2019 Photonics North Conference, Green Photonics, Energy and Related Technologies, Co-Chair

2018 - 2019	SPIE the international society for optics and photonics, SPIE JPE Special Section on Solar Energy Solutions for Electricity and Water Supply in Rural Areas, Editor
2019	National Defense Science and Engineering Graduate (NDSEG) Fellowships, Graduate Fellowships, Reviewer, Grant Proposals
2016 - 2019	Optical Society of America, Laser Systems Technical Group, Chair
2018	Optical Society of America, Lead Feature Editor OSA Biomedical Optics Express Journal: "Mid-infrared lasers for medical applications"
2018	Optical Society of America, Volunteer
2018	Natural Sciences and Engineering Research Council of Canada, Strategic Partnership Grant Project, Reviewer, Grant Proposals
2016 - 2018	SPIE the international society for optics and photonics, Guest Editor for Special Section of the SPIE Journal of Photonics for Energy (JPE) on Tandem Junction Solar Cells, Editor, https://www.spiedigitallibrary.org/journals/journal-of-photonics-for-energy/volume-8/issue-02/022600/Special-Section-Guest-Editorial-Tandem-Junction-Solar-Cells/10.1117/1.JPE.8.022600.full?SSO=1
2018	National Defense Science and Engineering Graduate (NDSEG) Fellowships, Graduate Fellowships, Reviewer, Grant Proposals
2017	2017 Photonics North Conference, Green Photonics, Energy and Related Technologies, Co-Chair
2017	Lead Feature Editor for OSA Applied Optics Journal: Near- to mid-IR (1-13 μm) III-V Semiconductor Lasers, Editor

Department

2018 - Present	CCOM – Department Search Committee, Member
2014 - Present	Undergraduate Committee, Member
2017 - 2018	2017-2018 ECE Senior Design Mentor, Advised a group of four ECE students on the development of an automated Light-Current-Voltage setup using Labview for laser and LED measurements in the Toor lab.
2016 - 2017	ECE Faculty Secretary

College

2018 - Present	CON - Strategic Leadership Team, Member
2018 - Present	CON - Strategic Leadership Team, Member
2017 - 2018	2017-2018 BME Senior Design Mentor, Advised a group of four BME students on the electromagnetic simulations of UV light for an innovative dental file.

University

2018 - Present	CON - Strategic Leadership Team, Steering Committee
2018 - Present	CON - Technology Committee, Board of Advisors
2017 - Present	WISE Advisory Board, Member
2016 - Present	2017 Women's Conference University of Iowa, Member
2016 - Present	2018 Women's Conference University of Iowa, Member
2016 - Present	2019 Women's Conference University of Iowa, Member
2016 - 2019	IP Enhancement Project Sponsored by OVPR's Office, Researcher, UV dental file project where I provide expertise on the photonics aspects of the prototype development.
2019	CGRER Grant Reviewer, Reviewer, Grant Proposals
2018 - 2019	Microscopy Equipment Evaluation Committee for CMRF, Member
2018	2018 Honors Scholarship, Reviewer
2017	TEConomy Medical Device Advising Group Organized by the OVPR's Office, Member, Gather insight from the group members regarding opportunities for advancing the Medical Device platform, areas of focus and specific potential at UI, and preliminary discussion of potential strategy and action areas.
2017	Judge for the Fall Undergraduate Research Festival

Community

2018	WiSE Belin-Blank Jr. Scholars Institute Summer Camp, Chair, Cell Morphology of Tumor Cells and Design Implementation and Engineering of a Microscope In collaboration with Chelle Lehman (Co-Director for Recruitment and Outreach, Women in Science and Engineering) and Professor Rebecca Dodd (https://medicine.uiowa.edu/mcb/faculty/rebecca-dodd)
2018	Graduate Women in Science, 2018 Graduate Women in Science (GWIS) 97th National Meeting, Guest Speaker, Professor Toor speaks at the 2018 Graduate Women in Science (GWIS) 97th National Meeting hosted by the University of Iowa from June 15-16, 2018. The title of the talk was: Success is stumbling from failure to failure with no loss of enthusiasm.
2017	WiSE Belin-Blank Jr. Scholars Institute Summer Camp, Chair
2016	Solar Camp for for Iowa First Nations Students
2016	All Girls Photonics STEM Camp (funded by the IEEE Photonics Society), An all girls Photonics Camp for 4th-6th graders organized on Jan 23rd, 2016
2015	Faculty Judge for Project Lead The Way Environmental Sustainability Camp, Judge
2015	Solar Camp for for Iowa First Nations Students
2005 - 2009	Mentoring program for incoming female graduate students in electrical engineering at Princeton University
2005 - 2009	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, Presenter
2008	Women in Science and Engineering (WISE) conference at Princeton University
2006	Women in Science and Engineering (WISE) conference at Princeton University

Media Contributions

2019	Magazine, SPIE Professional Magazine, International Affordable photovoltaic technology at the nexus of energy and water
2018	Magazine, SPIE Professional Magazine, International Design of Si-based tandem photovoltaic modules: path toward commercialization
2016	Magazine, SPIE Professional Magazine, International Perovskite Solar Cell Fever