

# Dr. Irfan Ullah

Electrical Engineering Department  
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## Research Interests

Renewable energy systems, Concentrating Solar Technologies, Concentrating Photovoltaic, Solar thermal

## Professional Experience

- 2018 - current **Director of Projects**  
Electrical Engineering Department, University of Management and Technology, Lahore, Pakistan
- 2016 - current **Assistant Professor**  
Electrical Engineering Department, University of Management and Technology, Lahore, Pakistan
- 2015 **Post-Doctoral Fellow**  
National Taiwan University of Science and Technology, Taipei, Taiwan
- 2015 **Research Fellow**  
Competence Centre Envelopes and Solar Energy, Lucerne University of Applied Sciences and Arts, Switzerland
- 2014 - current **Founding Editor-in-Chief**  
Journal of Daylighting (Indexed: Scopus, Elsevier)
- 2013-2014 **Software Engineer**  
Moori Technologies Co., Yongin, South Korea
- 2011-2015 **Doctoral Fellow**  
Myongji University, South Korea

## Courses Taught

### BS Courses

- Renewable Electrical Energy Resources
- Power System Protection
- High Voltage Engineering
- Electrical Machine
- Electrical Machine Design

### MS & PhD courses

- Photovoltaic Energy Systems
- Advanced Power Systems
- Photonics Technologies

## Education

- 2011-2014 **MS & PhD in Concentrating Solar Technologies**  
Myongji University, South Korea
- 2006-2011 **BSc in Electrical Engineering**  
COMSATS University, Lahore, Pakistan

## Honors & Awards

- **Guest editor** of special issue “innovative design simulation and monitoring of daylighting and PV/Thermal systems in buildings” 2017, Buildings, MDPI
- Received the “**Bronze Paper Award**” at the IEEE Seoul Section Student Paper Contest, 2014
- Received the “**Best Thesis Award**” at the Myongji University, 2014
- Received the “**Best Paper Award**” at the Myongji University Research Paper Contest, 2013
- Received the “**Bronze Paper Award**” at the IEEE Seoul Section Student Paper Contest, 2013
- Received the “**Bronze Paper Award**” at the IEEE Seoul Section Student Paper Contest, 2012

## Simulation Software and Programming

LightTools (8 years)  
DIALux (7 years)  
Labview (2 years)  
FFT, DSP (1 years)

Tracepro (4 years)  
SolidWorks (5 years)  
AutoCAD (2 years)  
MATLAB (7 years)

FRED (2 years)  
ANSYS (1 years)  
SketchUp (2 years)  
C, C++ (10 years)

HTML5, PHP (3 years)

MySQL (3 years)

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## Expertise

- Concentrating solar technologies (concentrated photovoltaic, heliostats, multi-junction solar cells)
- Solar thermal (dish-stirling systems, solar water heating, thermal power systems)
- Active daylighting systems (1-axis and 2-axis sun-tracking)
- Power protection & converters (Relays, 3-phase inverters and rectifiers, resonant converters)
- Designing of power transformers and distribution transformers
- Designing of synchronous and induction generators
- Interferometer (calibration, image processing)
- Wind energy conversion systems and hydro energy systems
- Illumination systems (designing of light sources, light diffusers, light guides, etc.)
- Automotive lighting (designing of high-beam reflectors and lenses)
- 3D modeling and ray-tracing simulation of optical systems
- Automobile collision avoidance systems (LIDAR, SONAR technologies)

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## Research Projects

1. Concentrated Photovoltaic System (*Eight-fold Fresnel, octagonal lens, uniform irradiance*)
2. Solar Concentrating system (*parabolic trough, linear Fresnel lens, compound parabolic concentrator*)
3. Heliostat-Based Solar Concentrating System (*large-scale system for multi-story buildings, light-guide*)
4. Solar Concentrating System using Collimated Light (*parabolic reflector, Fresnel lens, plano-convex lens*)
5. Illumination System using Photonics Engineering (*light collimator, prismatic diffuser*)
6. Solar Light Redirecting Components (*prismatic light guide for daylighting, light redirecting prismatic-film*)
7. Hyperspectral Imaging System (*interferometer, FFT, DSP, IR camera, image processing, software development*)
8. LIDAR for automobile applications (*lenses, laser, microprocessor*)
9. Autonomous Robot Navigation (*object-tracking, accident avoidance, sonar and IR sensors, mobile robot*)

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## Volunteer Experience

### Reviewer

Renewable Energy, Elsevier  
International Journal of Energy Research, John Wiley & Sons  
Journal of Renewable and Sustainable Energy, AIP  
Optics Express, Applied Optics, OSA  
Optical Engineering, Journal of Photonics for Energy, SPIE  
Frontiers in Energy Research, Frontiers  
Journal of Renewable Energy, Hindawi

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## Supervised thesis and Projects

### MS Thesis

- 2018-2019 MPPT Algorithm for Photovoltaic Energy System  
2018-2019 Hybrid Concentrating Photovoltaic and Thermal (CPV/T) System  
2017-2018 Load Flow Analysis of Islanded Microgrid Using Particle Swarm Optimization (PSO)  
2017-2018 Parabolic Solar Trough with Secondary Reflector for Solar Concentrator  
2017-2018 Evaluation of secondary optical elements for concentrated photovoltaic system

### BS Projects

- 2018-2019 Photovoltaic (PV) Based Hybrid Outdoor Lighting System  
2017-2018 Small Scale Wind Energy Conversion System  
2017-2018 Smart Street Sweeping Machine  
2016-2017 Vehicle Collision Warning System Using Laser Sensor  
2016-2017 Remotely Controlled Electric Lawn Mower  
2016-2017 Solar Powered Autonomous Lawn Mower Robot

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## Professional Talks

- Feb 2018 International Conference on Energy Systems for Sustainable Development, Lahore, Pakistan.  
Dec 2014 IEEE Student Paper Contest, IEEE Seoul Section, Seoul, South Korea  
Nov 2014 International Conference on Sustainable Lighting and Light Pollution, Seoul, South Korea  
Dec 2013 IEEE Student Paper Contest, IEEE Seoul Section, Seoul, South Korea  
Dec 2012 IEEE Student Paper Contest, IEEE Seoul Section, Seoul, South Korea  
May 2012 Conference on Optoelectronics & Optical Communications, Gangneung, South Korea

Mar 2012	Pacific Power and Energy Engineering Conference, Shanghai, China
Nov 2011	Photonics Conference, Pyeongchang, South Korea
July 2011	International conference on Computer networks and Information Technology, Abb., Pakistan
Oct 2010	International Conference on Intelligence and Information Technology, Lahore, Pakistan

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### Participated workshops, seminars, and exhibitions

Aug 2017	Faculty Development Program, UMT, Lahore, Pakistan
July 2016	International Business Conference & Exhibition (IBCE), Expo Center, Lahore
Apr 2016	Workshop on “Funded Research (Design, Funding and Execution)”, UMT, Lahore, Pakistan
Feb 2014	Workshop on “High Achievers”, UMT, Lahore, Pakistan

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### Administrative tasks/appointments

2016-2018	Batch advisor, Electrical Engineering Department, UMT
2016-2018	Departmental graduate committee member, Electrical Engineering Department, UMT
2016-2018	Departmental Outcome Based Education (OBE) committee member, EE, UMT

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### Membership

- HEC Approved PhD Supervisor, Pakistan Engineering Council, IEEE, CrossRef, SolarLits

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### Publications

**Total publications:** 34      **Total impact factor:** 18      **Total citations (GS):** 263

“First Author in 31 papers”

#### International Journals

1. Irfan Ullah, Hui Lv, Allen Jong-Woei Whang, Yuehong Su, Analysis of a Novel Design of Uniformly Illumination for Fresnel Lens-based Optical Fiber Daylighting System, **Energy and Buildings**, vol. 154, pp. 19-29, 2017. (IF 4.457)
2. Irfan Ullah and Allen Jong-Woei Whang, Development of Optical Fiber-Based Daylighting System and Its Comparison, **Energies**, vol. 8, no. 7, pp. 7185-7201, 2015. (IF 2.676)
3. Bo-Jian Chen, Bo-Yuan Gao, Irfan Ullah, Kuan-Yu Chen, Chun-Han Chou, Chia-Min Lin, Cheng-Ming Chang, Kai-Cyuan Jhan, Allen Jongwoei Whang, Freeform Microstructure Linear Light Emitter Design for Nature Light Illumination System, **Applied Optics**, vol. 54, no. 28, pp. E159-E164, 2015. (IF 1.791)
4. Bo-Jian Chen, Yin-Ti Chen, Irfan Ullah, Chun-Han Chou, Kai-Cyuan Chan, Yi-Lung Lai, Chia-Ming Lin, Cheng-Ming Chang, Allen Jong-Woei Whang, An innovative light collimator with Afocal lens and TIR lens for daylighting system, **Applied Optics**, vol. 54, no. 28, pp. E165-E170, 2015. (IF: 1.791)
5. Irfan Ullah, Development of Fresnel-based Concentrated Photovoltaic (CPV) System with Uniform irradiance, **Journal of Daylighting**, vol. 1, no. 1, pp. 2-7, 2014.
6. Irfan Ullah and Seoyong Shin, Highly Concentrated Optical Fiber-Based Daylighting Systems for Multi-Floor Office Buildings, **Energy and Buildings**, vol. 72, pp. 246-261, 2014. (IF 4.457)
7. Irfan Ullah, Furqan Ullah, Qurban Ullah, and Seoyong Shin, Integrated Tracking and Accident Avoidance System for Mobile Robot, **International Journal of Control, Automation, and Systems**, vol. 11, no. 6, pp. 1253-1265, 2013. (IF: 2.173)
8. Irfan Ullah and Seoyong Shin, Concept of Solar Tower for Daylighting in Multi-floor Buildings, **Journal of Green Science and Technology**, vol. 1, no. 2, pp. 79-84, 2013.
9. Irfan Ullah and Seoyong Shin, Uniformly Illuminated Efficient Daylighting System, **Smart Grid and Renewable Energy**, vol. 4, no. 2, pp. 161-166, 2013.
10. Irfan Ullah, Qurban Ullah, Furqan Ullah, and Seoyong Shin, Sensor-based Autonomous Robot Navigation with Distance Control, **Journal of Computational Intelligence and Electronic Systems**, vol. 1, no. 2, pp. 161-167, 2012.
11. Irfan Ullah, Furqan Ullah, Qurban Ullah, and Seoyong Shin, Object Following Fuzzy Controller for a Mobile Robot, **Journal of Computational Intelligence and Electronic Systems**, vol. 1, no. 1, pp. 86-90, 2012.
12. Irfan Ullah, Furqan Ullah, Qurban Ullah, and Seoyong Shin, Sensor-Based Robotic Model for Vehicle Accident Avoidance, **Journal of Computational Intelligence and Electronic Systems**, vol. 1, no. 1, pp. 57-62, 2012.
13. Irfan Ullah and Seoyong Shin, Development of Optical Fiber-based Daylighting System with Uniform Illumination, **Journal of the Optical Society of Korea**, vol. 16, no. 3, pp.247-255, 2012. (IF 0.637) (Best paper award)

#### Editorials

1. Irfan Ullah, Welcome to the Journal of Daylighting, **Journal of Daylighting**, vol. 1, no. 1, pp.1, 2014.

2. Irfan Ullah, Daylight for Healthy Indoor Environment and Energy Benefits, **International Journal of Ophthalmology & Eye Science**, vol. 2, no. 1, 2014.

#### **International Conferences**

1. Abid Ali Dogar, Zunaira Huma Malik, Irfan Ullah, Photovoltaic based PWM inverter using experimental approach, International Conference on Energy Systems for Sustainable Development, Lahore, Pakistan, Feb 21-23, 2018.
2. Irfan Ullah and Seoyong Shin, Fresnel-based Concentrated Photovoltaic (CPV) System with Uniform Irradiance, Proceedings of the 2014 IEEE Seoul Section, pp. 59-64, Seoul, South Korea, Dec 6, 2014. (**Bronze paper award**)
3. Irfan Ullah and Seoyong Shin, Large-scale Daylighting Systems using Non-imaging Concentrators, Proceedings of the 2013 IEEE Seoul Section, pp. 38, Seoul, South Korea, Dec 14, 2013. (**Bronze paper award**)
4. Irfan Ullah, Development of daylighting system with uniform illumination and its comparison, International Conference on Sustainable Lighting and Light Pollution, pp.193-200, Seoul, South Korea, Nov 5-7, 2014.
5. Irfan Ullah and Seoyong Shin, Design of Solar Lighting System to achieve uniform illumination over fiber-bundle, Proceedings of the 2013 IEEE Seoul Section, pp. 42, Seoul, South Korea, Dec 14, 2013.
6. Irfan Ullah, Qurban Ullah, and Seoyong Shin, Design of Solar Lighting System for Energy Saving, International Conference on Modeling and Simulation (ICOMS-2013), pp. 209-214, Islamabad, Pakistan, Nov 25-27, 2013. (IEEE)
7. Irfan Ullah, Qurban Ullah, and Seoyong Shin, Energy-efficient Daylighting Systems for Multi-story Buildings, International Conference on Modeling and Simulation (ICOMS-2013), pp. 215-220, Islamabad, Pakistan, Nov 25-27, 2013. (IEEE)
8. Irfan Ullah and Seoyong Shin, Fiber-optic Daylighting Systems for Large-scale Building Interiors, International Conference on Sustainable Building Asia (SB13 Seoul), pp. 434-438, Seoul, South Korea, July 8-10, 2013.
9. Irfan Ullah and Seoyong Shin, Design of a Large-scale Fiber Optic Daylighting System Using Parabolic Trough and Linear Fresnel lens, Proceedings of the 2012 IEEE Seoul Section, pp. 44, Seoul, South Korea, Dec 1, 2012. (**Bronze paper award**)
10. Irfan Ullah, Qurban Ullah, Furqan Ullah, and Seoyong Shin, Integrated Collision Avoidance and Tracking System for Mobile Robot, 2012 International Conference on Robotics and Artificial Intelligence (ICRAI), pp. 68-74, Rawalpindi, Pakistan, Oct 20-23, 2012. (IEEE)
11. Irfan Ullah, Qurban Ullah, Furqan Ullah, and Seoyong Shin, Mobile Robot Navigation with Distance Control, 2012 International Conference on Robotics and Artificial Intelligence (ICRAI), pp. 61-67, Rawalpindi, Pakistan, Oct 20-23, 2012. (IEEE)
12. Irfan Ullah and Seoyong Shin, Development of optical fiber-based daylighting system with collimated illumination, 2012 17th Opto-Electronics and Communications Conference (OECC), pp. 596-597, Busan, South Korea, 2-6 July 2012. (IEEE)
13. Irfan Ullah and Seoyong Shin, Optical fiber-based daylighting system for multi-floor office buildings, The 19th Conference on Optoelectronics & Optical Communications (COOC 2012), pp. 322-323, Gangneung, South Korea, May 16-18, 2012.
14. Irfan Ullah and Seoyong Shin, Heliostat based daylighting system for multi-floor office buildings, The 19th Conference on Optoelectronics & Optical Communications (COOC 2012), pp. 85-86, Gangneung, South Korea, May 16-18, 2012.
15. Irfan Ullah and Seoyong Shin, Uniformly Illuminated Efficient Daylighting System, 2012 Asia-Pacific Power and Energy Engineering Conference (APPEEC), Shanghai, China, March 27-29, 2012.
16. Irfan Ullah and Seoyong Shin, Uniformly illuminated optical fiber-based solar lighting system, Photonics Conference 2011, pp. 286-287, Pyeongchang, South Korea, Nov 30-Dec 2, 2011.
17. Irfan Ullah, Furqan Ullah, and Qurban Ullah, Real-time object following fuzzy controller for a mobile robot, 2011 International conference on Computer networks and Information Technology (ICCNIT), pp. 241-244, Abbottabad, Pakistan, July 11-13, 2011. (IEEE)
18. Irfan Ullah, Furqan Ullah, and Qurban Ullah, A sensor based robotic model for vehicle collision reduction, 2011 International conference on Computer networks and Information Technology (ICCNIT), pp. 251-255, Abbottabad, Pakistan, July 11-13, 2011. (IEEE)
19. Irfan Ullah, Furqan Ullah, and Kang Park, Sensor Based Robotic Navigation and Distance Control, 2010 International Conference on Intelligence and Information Technology (ICIIT 2010), vol. 2, pp. 59-63, Lahore, Pakistan, Oct 28-30, 2010.