PEICHEN YU 余沛慈

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EDUCATION

1999-04	**Ph.D. in Electrical Engineering**	**University of Michigan, Ann Arbor, MI**
1996-98	**M.S. in Electro-Optical Engineering**	**National Chiao-Tung University, Hsinchu, Taiwan**
1992-96	**B.S. in Electrophysics**	**National Chiao-Tung University, Hsinchu, Taiwan**

WORK AND RESEARCH EXPERIENCE

08/2013-present **Professor, Department of Photonics National Yang Ming Chiao Tung University, Hsinchu, Taiwan**

1. Developed and validated a cloud-native, GPU-accelerated optical proximity correction (OPC+) platform enabling half-mask inverse lithography for freeform and curvilinear metasurface patterns.
2. Developed a mass-production pipeline for large-area metasurfaces and diffractive Augmented Reality (AR) waveguide structures on eight-inch glass wafers using KrF photolithography.
3. Developed AI-driven Inverse Lithography technology (ILT) strategies and simulation flow for image formation in EUV projection lithography for advanced CMOS fabrication.

08/2009-07/2013 **Associate Professor, Department of Photonics National Chiao-Tung University, Hsinchu, Taiwan**

1. Developed hybrid organic/inorganic hetero-junction solar cells for next-generation photovoltaics
2. Developed transparent conductive nano-materials for applications in optoelectronic devices
3. Developed nano-fabrication technologies for multi-junction, silicon, and polymer solar cells.
4. Developed inverse mask and illumination synthesis approaches for model-based SRAF generation and design rules for CMOS 22 nm node and beyond.

08/2006-08/2009 **Assistant Professor, Department of Photonics National Chiao-Tung University, Hsinchu, Taiwan**

1. Developed functional nanostructures for applications in light-emitting diodes and solar cells.

2. Developed GaN-based photonic crystal light sources for applications in UV/blue light emitting diodes and lasers.

3. Developed inverse lithography algorithms for model-based SRAF generation

08/2004-07/2006 **LEA Design Engineer, Advanced Design** **Intel Corp., Hillsboro, Oregon**

Lithography Enhancement Algorithm (LEA) responsibilities:

- Developed model-based optical proximity correction (OPC) algorithms for the diffusion layers for 45nm technology with three innovative ideas. One was classified as an Intel trade secret.
- Generated exhaustive test sets to facilitate design rule revisions, OPC model, and recipe development for 45nm technology.
- Optimizing and sustaining OPC recipes for source-drain diffusion layers for 65nm technology.

HONORS AND AWARDS

- 2025 Excellent Mentor Award, College of EEC, National Yang Ming Chiao Tung University 電機學院導師獎
- 2023 Future Tech award 未來科技獎
- 2023 NARLabs R&D Service Platform Achievement Awards 國家實驗研究院研發服務平台亮點成果獎
- 2021 Excellent Teaching Award, Dept. of Photonics, College of EECS, National Chiao Tung University. 國立交通大學電

機學院光電系 田家炳優良教學獎

- 2013 Dr. Wu Da-You Memorial Award, National Science Council in Taiwan. 國科會吳大猷先生紀念獎
- 2013/2012 Outstanding Teaching Award, Dept. of Photonics, College of EECS, National Chiao Tung University. 國立交通大學電機學院 傑出教學獎
- 2011Outstanding Yong Women Scientists in Taiwan.第四屆傑出女科學家新秀獎物質科學類
- 2010 Y. Z. Hsu Scientific Paper Award, Taiwan. 第八屆有庠科技論文獎-綠色科技類
- 2010 Excellent Undergraduate Mentor Award, National Chiao Tung University 2010 國立交通大學光電工程系績優導師

SOCIETY SERVICE

- **Area1 Program Chair**, The **44th** IEEE Photovoltaic Specialists Conference (IEEE PVSC) , Washington DC USA **2017**.
- **Program Committee**, The 26th International Photovoltaic Science and Engineering Conference (PVSEC-26) 24 - 28 October 2016, Singapore
- Photonics West **2012/2013/2014/2015/2016/2017** OPTO Physics, Simulation, and Photonic Engineering for Photovoltaic Devices conference, San Francisco, CA USA.
- **Co-chair (Area1)**, The **41st – 43rd** IEEE Photovoltaic Specialists Conference (IEEE PVSC) **2014/2015/2016**.
- **Regional Executive Director,** Asian Nanoscience and Nanotechnology Association of Taiwan (ANNA-Taiwan)
- **Program Committee (Area1)**, The **37th/38th/39th**IEEE Photovoltaic Specialists Conference (IEEE PVSC) **2011-2013**.
- **Technical Program Committee**, IEEE International Conference on Nanotechnology (IEEE NANO) **2009**/ **2011**.
- **Program Committee**, **2009-2013, 2016-2025** International Conference in Optics and Photonics in Taiwan (OPTIC'09-13, OPTIC'16-25).
- **Vise-chair**, 2011/2012 RCAS-ANNA Symposium, International Conference Lecture Hall, Building of Humanity and Social Sciences, Academia Sinica, Taipei, Taiwan.
- **Organizing Committee**, The 4th International Workshop on Science and technology of Crystalline Silicon Solar Cells 2010 (4th CSSC), Taipei Taiwan, October 27-29 2010.
- **Reviewer** for Advanced Materials, ACS Nano, Advanced Functional Materials, Advanced Energy Materials, Progress in Photovoltaics: Research and Applications , Solar Energy Materials & Solar Cells, Optics Express, Applied Physics Letters, Journal of Physical Chemistry, ACS Applied Materials & Interfaces, IEEE Photonics Technology Letters, Journal of the Electrochemical Society, etc.

PUBLICATIONS

Selected Archival Journal Articles:

1. H.-L. Liu, S.-H. Su, P.-K. Chang, Y.-C. Chang, Y.-W. Huang, C.-W. Chang, T. M. Huang, C. C. Chen, W.H. Huang, J. M. Hsieh, and **P. Yu***, "Intelligent proximity correction enabled large-area metasurfaces by KrF photolithography," IEEE Access, vol. 13, pp. 195517–195525, 2025.
2. W. P. Liao, H. L. Liu, Y. F. Lin, S. S. Su, Y. T. Chen, G. B. Lin, T. C. Tseng, T. K. Lin, C. C. Chen, W. H. Huang, S. W. Chen, J. M. Shieh, **P. Yu*,** and Y. C. Chang*, "I-line photolithographic metalenses enabled by distributed optical proximity correction with a deep-learning model," Opt. Express, vol. 30, no. 12, pp. 21184-21194, Jun. 2022.
3. P. Y. Hsieh, S. L. Fang, Y. S. Lin, W. H. Huang, J. M. Shieh, **P. Yu**, and Y. C. Chang, "Integrated metasurfaces on silicon photonics for emission shaping and holographic projection," Nanophotonics, vol. 11, no. 21, pp. 4687-4695, Nov. 2022.
4. P. Y. Hsieh, S. L. Fang, Y. S. Lin, W. H. Huang, J. M. Shieh, P. Yu, and Y. C. Chang, "Metasurfaces on silicon photonic waveguides for simultaneous emission phase and amplitude control," Opt. Express, vol. 31, no. 8, pp. 12487-12496, Apr. 2023.
5. **P. Yu***, C. Y. Tsai, J. K. Chang, C. C. Lai, P. H. Chen, Y. C. Lai, P. T. Tsai, M. C. Li, H. T. Pan, Y. Y. Huang, C. I. Wu, Y. L. Chueh, S. W. Chen, C. H. Du, S. F. Horng, and H. F. Meng, "13% Efficiency Hybrid Organic/Silicon-Nanowire Heterojunction Solar Cell via Interface Engineering," ACS Nano, vol. 7, pp. 10780-10787, Nov. 2013.
6. J. Yu, **P. Yu***, and H. Chao, "Library-Based Illumination Synthesis for Critical CMOS Patterning," IEEE Trans. Image Process., vol. 22, pp. 2811-2821, Jul. 2013.

7. J. C. Yu and **P. Yu***, "Impacts of cost functions on inverse lithography patterning," Opt. Express, vol. 18, no. 22, pp. 23331-23342, Oct. 2010.

Selected Conference/Meeting Presentations:

1. P.H. Fang, P. Chang, L.-F. Chen, Y.-L. Chen, **P. Yu***, "Quasi phase-only mask (POM) for high contrast EUV imaging," Proc. SPIE 13424, Optical and EUV Nanolithography XXXVIII, 134241J (22 April 2025); https://doi.org/10.1117/12.3051257 ASML-Cymer Leadership for Best Student Paper Award.
2. Y.C. Chang, C. E. Lin, **P. Yu***, "Reducing eye glow in augmented reality waveguide through topological metagrating design," SPIE AR|VR|MR (28 January 2025)「Optical Design Challenge」 2nd place
3. J. C. Yu and **P.Yu***, "Choosing objective functions for inverse lithography patterning", 2011 SPIE Advanced Lithography, Optical Microlithography XXIV, Proceedings of SPIE Volume 7973 (Poster) Best Student Paper Award
4. Y.-C. Lee, H.-H. Huang, Y.-R. Wu, and **P. Yu***, "Manipulative Polarization of a-plane InGaN/GaN Photonic Crystals for Enhanced Spontaneous Emission", 2010 MOC, 16th Micro-Optics Conference (Poster) Best Poster Award
5. C. H. Chang, **P. Yu***, M. H. Hsu, C. H. Chiu, and H. C. Kuo, "Enhanced Conversion Efficiency of GaAs Photovoltaics Utilizing Anti-Reflective Indium-Tin-Oxide Nano-Columns" 2009 MRS Spring, Material Research Society (Poster) Best Poster Award
6. J. C. Yu, **P. Yu***, and H. Y. Chao, "Model-Based Sub-Resolution Assist Features Using an Inverse Lithography Method", SPIE Lithography Asia – Taiwan, Proceedings of SPIE Volume 7140, November 2008. (Oral) Best Student Paper Award Also highlighted by SPIE Newsroom *http://spie.org/x33577.xml?ArticleID=x33577*

SELECTED INTERNATIONAL AND INDUSTRIAL COLLABORATION

- **Dr. David Thomson at University of Southampton UK,** a National Science Council Taiwan-Royal Society UK (NSC-RS) joint proposal on *Advancing Silicon Photonics Fabrication through AI-Powered Resolution Enhancement Technology (RETs) for DUV Lithography,* 2025-2027.
- **Taiwan Semiconductor Manufacturing Company (TSMC) -University Joint Develop Program (JDP)**,

1. *GPU-Friendly Machine Learning (ML) for Inverse Lithography Technology (ILT) and Aerial Image Calculation*, 2025.3.1~2028.2.28.
2. *Reducing Mask 3D Effects via Source Mask Optimization with Rigorous Electromagnetic Simulation for EUV Lithography*, 2024.3.1~2025.2.28.
3. *Reticle Optimization through Rigorous Electromagnetic Simulation and Hopkin's Aerial Image Formulation for Extreme Ultraviolet Lithography*, 2023.3.1~2024.2.29.
4. *High Performance Near-Infrared CMOS Image Sensor via Light Harvesting and Surface Passivation,* 2017.2.15~2018.2.14.
5. *Innovative Inverse Lithography Approach for Advanced Optical Microlithography*, 2009.11~2010.11.

- **Dr. Martin Charlton at University of Southampton UK,** a National Science Council Taiwan-Royal Society UK (NSC-RS) joint proposal on "Photonic Crystal enhanced LEDs and Photovoltaic devices", 2011-2013.