

RESUME of CHANG-HUA LIU

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EDUCATION

University of Michigan, Ann Arbor *2008-2014*

– *PhD, Department of Electrical Engineering and Computer Science*

National Tsing Hua University (NTHU), Taiwan *2002-2006*

– *Bachelor of Science, Department of Power Mechanical Engineering*

EXPERIENCE

*Associate Professor at the Department of Electrical Engineering,
National Tsing Hua University* *2021/08-present*

*Assistant Professor at the Department of Electrical Engineering,
National Tsing Hua University* *2017/08-2021/07*

Postdoc at the Department of Physics, University of Washington *2015/09-2017/07*
Research Topic: Photonic Light Emitters based on 2D Materials

*Postdoc at the Department of Materials Science and Engineering,
Northwestern University* *2014/02-2015/08*

Research Topic: Strong-coupling Optomechanics based on 2D Materials

*Research Assistant at the Department of Electrical Engineering,
University of Michigan* *2008/09-2014/01*

Ph.D. Thesis: Characterization of Nanoscale Junctions in Carbon Nanotubes and Graphene
for Novel Device Applications

Research Assistant at Institution of Occupational Safety and Health, Taiwan *2008/01-2008/06*
Research Topic: Fiber-Optic Distributed Sensing by Brillouin Optical Correlation Domain
Analysis

PUBLICATIONS

1. Po-Liang Chen, Tian-Yun Chang, Pei-Sin Chen, Alvin Hsien-Yi Chan, Adzilah Shahna Rosyadi, Yen-Ju Lin, Pei-Yu Huang, Jia-Xin Li, Wei-Qing Li, Chia-Jui Hsu, Neil Na, Yao-Chang Lee, Ching-Hwa Ho, **Chang-Hua Liu***, “Van der Waals heterostructure mid-infrared emitters with electrically controllable polarization states and spectral characteristics”, *ACS Nano* 17, 10181 (2023).
2. Shyam Narayan Singh Yadav, Po-Liang Chen, **Chang-Hua Liu***, Ta-Jen Yen*, “Plasmonic metasurface integrated black phosphorus-based mid-infrared photodetector

with high responsivity and speed”, *Advanced Materials Interfaces* 10, 2202403 (2023).

3. Jia-Xin Li, Wei-Qing Li, Sheng-Hsiung Hung, Po-Liang Chen, Yueh-Chiang Yang, Tian-Yun Chang, Po-Wen Chiu, Horng-Tay Jeng*, **Chang-Hua Liu***, “Electric control of valley polarization in monolayer WSe₂ using a van der Waals magnet”, *Nature Nanotechnology* 17, 721-728 (2022). (*Selected as the Cover Image of Nature Nanotechnology July 2022 Issue and Highlighted by The News Lens, Tech News, EE Times Taiwan, Liberty Times, Central News Agency, United Daily News*)
4. Tian-Yun Chang, Po-Liang Chen, Pei-Sin Chen, Wei-Qing Li, Jia-Xin Li, Ming-Yuan He, Jen-Te Chao, Ching-Hwa Ho, **Chang-Hua Liu***, “Van der Waals Heterostructure Photodetectors with Bias-Selectable Infrared Photoresponses.” *ACS Applied Materials & Interfaces* 14, 32265 (2022).
5. Po-Liang Chen, Yueyang Chen, Tian-Yun Chang, Wei-Qing Li, Jia-Xin Li, Seokhyeong Lee, Zhuoran Fang, Mo Li, Arka Majumdar, **Chang-Hua Liu***, “Waveguide-Integrated van der Waals Heterostructure Mid-Infrared Photodetector with High Performance.” *ACS Applied Materials & Interfaces* 14, 24856 (2022). (*Selected as the Supplementary Cover*)
6. Adzilah Shahna Rosyadi, Alvin Hsien-Yi Chan, Jia-Xin Li, **Chang-Hua Liu**, Ching-Hwa Ho, "Formation of van der Waals Stacked p-n Homojunction Optoelectronic Device of Multilayered ReSe₂ by Cr Doping." *Advanced Optical Materials* 10, 2200392 (2022).
7. Tian-Yun Chang, Yueyang Chen, De-In Luo, Jia-Xin Li, Po-Liang Chen, Seokhyeong Lee, Zhuoran Fang, Wei-Qing Li, Ya-Yun Zhang, Mo Li, Arka Majumdar*, **Chang-Hua Liu***, “Black Phosphorus Mid-Infrared Light-Emitting Diodes Integrated with Silicon Photonic Waveguides”, *Nano Letters* 20, 6824-6830 (2020).
8. Tian-Yun Chang, Po-Liang Chen, Jih-Heng Yan, Wei-Qing Li, Ya-Yun Zhang, De-In Luo, Jia-Xin Li, Kun-Ping Huang, **Chang-Hua Liu***, “Ultra-Broadband, High Speed, and High-Quantum-Efficiency Photodetectors Based on Black Phosphorus”, *ACS Applied Materials & Interfaces* 12, 1201-1209 (2020).
9. **Chang-Hua Liu***, J. Zheng, S. Colburn, T. Fryett, Y. Chen, X. Xu and A. Majumdar, “Van der Waals materials integrated nanophotonic devices.” *Optical Materials Express* 9, 384 (2019). (*Invited review article*)
10. F Hu, Y Luan, Jacob Speltz, D Zhong, **C.-H. Liu**, J Yan, DG Mandrus, X Xu, Zhe Fei, “Imaging propagative exciton polaritons in atomically thin WSe₂ waveguides.” *Physical Review B* 100, 121301 (2019).
11. T. Fryett, K. Seyler, J. Zheng, **Chang-Hua Liu**, X. Xu and A. Majumdar, “Silicon photonic crystal cavity enhanced second-harmonic generation from monolayer WSe₂.” *2D Materials* 4, 015031 (2017).
12. **Chang-Hua Liu***, J. Zheng, S. Colburn, T. Fryett, Y. Chen, X. Xu and A. Majumdar,

- “Ultrathin vander Waals metalenses.” *Nano Letters* 18, 6961 (2018). (Highlighted by [Ceramics.org](#), [Futurity.org](#), [knowridge.com](#), [Optics.org](#), [Asianscientist.com](#), [Techexplorist.com](#), [Phys.org](#), [ScienceDaily](#), [PhotonicsViews.com](#), [Newsbeezzer](#))
13. **Chang-Hua Liu**, G. Clark, T. Fryett, S. Wu, J. Zheng, F. Hatami, X. Xu and A. Majumdar, “Nanocavity integrated van der Waals heterostructure light emitting tunneling diode.” *Nano Letters* 17, 200 (2016). (Highlighted by [PhysOrg](#), [AzoNano](#), [EurekAlert](#), [Ecnmag](#), [Nanowerk](#))
 14. J. Hu, **Chang-Hua Liu**, X. Ren, L. Lauhon, T. Odom, “Plasmonic lattice lenses for multi-wavelengthachromatic focusing.” *ACS Nano* 10, 10275 (2016).
 15. Y. C. Chang, C. H. Liu, **Chang-Hua Liu**, S. Zhang, S. Marder, E. Narimanov, Z. Zhong and T. B. Norris, “Realization of mid-infrared graphene hyperbolic metamaterials.” *Nature communications* 7, 10568 (2016).
 16. **Chang-Hua Liu**, I. S. Kim, S. Park, K. Yoon, S. Howell and L. Lauhon, “Optical control of mechanical mode-coupling within a MoS₂ resonator in the strong-coupling regime.” *Nano Letters* 15, 6727 (2015).
 17. **Chang-Hua Liu**, Y. C. Chang, Y. Zhang, T. Norris and Z. Zhong, “Ultrafast lateral photo-Dember effect in graphene induced by nonequilibrium hot carrier dynamics.” *Nano Letters* 15, 4234 (2015).
 18. **Chang-Hua Liu**, Y. C. Chang, T. B. Norris and Z. Zhong, “Room temperature ultra-broadband and high responsivity graphene photodetectors.” *Nature Nanotechnology* 9, 273 (2014). (Highlighted by [CBS News](#), [Science Daily](#), [World News](#), [Discovery News](#), [Photonics Online](#), [PhysOrg](#), [NextBigFuture](#), [e!Science News](#), [Wired UK](#), [Huffington Post](#)., [Mashable](#), [NewStatesman](#), [gizmag](#))
 19. **Chang-Hua Liu**, N. M. Dissanayake, S. Lee, K. Lee and Z. Zhong, “Evidence for extraction of photoexcited hot carriers from graphene.” *ACS Nano* 6, 7172 (2012).
 20. S. Lee, K. Lee, **Chang-Hua Liu** and Z. Zhong, “Homogeneous bilayer graphene film based flexible transparent conductor.” *Nanoscale* 4, 639 (2012).
 21. **Chang-Hua Liu**, C.-C. Wu and Z. Zhong, “A fully tunable single-walled carbon nanotube diode.” *Nano Letters* 11, 1782 (2011).
 22. C.-C. Wu, **Chang-Hua Liu** and Z. Zhong, “One-step direct transfer of pristine single-walled carbon nanotubes for functional electronics.” *Nano Letters* 10, 1032 (2010).
 23. Y. Jung, M. N. Slipchenko, **Chang-Hua Liu**, A. E. Ribbe, Z. Zhong, C. Yang, and J.-X. Cheng, “Fast detection of the metallic state of individual single-walled carbon nanotubes using a transient- absorption optical microscope.” *Physical Review Letters* 105, 217401 (2010).
 24. C.-C. Cheng, C. A. Chang, **Chang-Hua Liu** and J. A. Yeh, “A tunable liquid-crystal microlens with hybrid alignment.” *Journal of Optics A: Pure and Applied Optics* 8, 365

(2006).

SELECTED PRESENTATIONS

1. **Chang-Hua Liu**, “Novel mid-infrared photodetectors and emitters using black phosphorus-based heterostructures.” SPIE Photonics West, *San Francisco (2023)*. (Invited)
2. **Chang-Hua Liu**, “Novel mid-IR optoelectronics based on van der Waals heterostructures.” *Recent Progress in Graphene and 2D Materials Research Conference, Taipei (2022)*. (Invited)
3. **Chang-Hua Liu**, “Black phosphorus optoelectronics for mid-infrared silicon photonics.” *SPIE Photonics West, Digital Forum (2021)*. (Invited)
4. **Chang-Hua Liu**, “Optoelectronics and nanophotonics based on van der Waals materials.” *SPIE Optics + Photonics, Digital Forum (2020)*. (Invited)
5. **Chang-Hua Liu**, “Optoelectronics and nanophotonics based on van der Waals materials.” SPIE Photonics West, *San Francisco (2020)*. (Invited)
6. **Chang-Hua Liu**, “Developing ultrathin light emitters and metalenses based on van der Waals materials.” *SPIE Photonics West, San Francisco (2019)*. (Invited)
7. **Chang-Hua Liu**, “Developing ultrathin light emitters and metalenses based on van der Waals materials.” *Recent Progress in Graphene and 2D Materials Research Conference, Guilin (2018)*. (Invited)
8. **Chang-Hua Liu**, “Novel Optoelectronic Properties and Devices Based on cavity-integrated 2D materials.” The 12th Cross-strait Symposium on Optoelectronics, *Hong Kong (2018)*. (Invited)
9. **Chang-Hua Liu**, “Optoelectronic devices based on cavity-integrated 2D materials.” *CLEO-PR, Singapore (2017)*. (Invited)

HONORS

- Young Scholar Innovation Award, Foundation of the Advancement of Outstanding Scholarship (2023)
- Y. Z. Hsu Scientific Paper Award (2023)
- Ta-You Wu Memorial Award (2022)
- Lam Research Award (2022)
- Outstanding Young Electrical Engineer Award, Chinese Institute of Electrical Engineering (2022)
- New Faculty Research Award, National Tsing Hua University (2021)

PATENTS

- “Photodetector Based on Double Layer Heterostructures.” (US patent number: US 9680038)
- “Mid-infrared Light Emitting Diode and Manufacturing Method Thereof, Silicon Photonic Circuit and Manufacturing Method Thereof.” (US patent application number: US 17/129,932, Taiwan patent application number: TW 109138125)

ADDITIONAL EXPERIENCE

Military Service, Taiwan

2007/01-2007/12

Academic Service:

- Serving as a reviewer for *Nature Communications*, *Physical Review Letters*, *Nano Letters*, *ACS Nano*, *Advanced Materials*, *Advanced Optical Materials*, *Optics Express*, *ACS Applied Electronic Materials*, *Photonics Research*, *Laser & Photonics Reviews*, *Applied Physics Letters*, *Journal of Applied Physics*, *IEEE Transactions on Nanotechnology*, *Journal of Nanophotonics*, *Nanophotonics*, *Journal of Physical Chemistry*.
- Co-Guest Editor, Coordinated Focus Issues of *Optical Materials Express*