

ZHEWEN YIN

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EDUCATION

- Ph.D.** in Mechanical Engineering May 2025
University of South Florida (USF), Tampa, U.S.
Dissertation: Strain-Mediated Manipulation of Two-Dimensional Materials: Wrinkling, Stretching, and Cracking
Supervisor: Michael Cai Wang
- M.S.** in Materials Science and Engineering Jun 2018
University of South Florida (USF), Tampa, U.S.
Thesis: Non-precious Metal Catalysts for Oxygen Reduction Reaction in Alkaline Solutions
Supervisor: Venkat R. Bhethanabotla, John N. Kuhn
- B.S.** in Nuclear Science and Technology Jun 2016
University of Science and Technology of China (USTC), Hefei, China
Thesis: Non-noble Metal and Its Application in Electrocatalysis
Supervisor: Li Song

RESEARCH INTERESTS

Synthesis/engineering/applications of 2D materials, nanomanufacturing of nanoribbons/quantum wires, soft actuator, characterization of microplastics

APPOINTMENTS

- Postdoctoral Researcher** USF, Tampa, U.S.
Michael Cai Wang's research group Aug 2025 – present
- Research Assistant** USF, Tampa, U.S.
Michael Cai Wang's research group Aug 2018 – May 2025
Venkat R. Bhethanabotla's research group Jan 2017 – May 2017
- Teaching Assistant** USF, Tampa, U.S.
EGN 3365: Materials Engineering Jan 2018 – Dec 2024
EML 3035: Programming Concepts Mechanical Engineering
EML 6930: Advanced Manufacturing
ECH 3002: Intro to Chemical & Biomedical Engineering
- Administrative Assistant** Work-study office, USTC Sep 2014 – Jan 2016

RESEARCH EXPERIENCE

- Ph.D. Degree & Postdoc Research** Aug 2018 – present
Department of Mechanical Engineering, USF Tampa, FL
- Developed a mechanical fracture method for scalable assembly of nanoribbons/quantum wires from various 2D materials with uniform width/spacing and under ambient conditions.
 - Studied directionally resolved strain-coupled phononic properties of monolayer MoTe₂ via *in situ* Raman spectroscopy, estimated the corresponding Grüneisen parameters.
 - Implemented a self-assembly method to deterministically align colloiddally synthesized gold nanoparticles of various sizes with templates designed from instability-driven, deformed 2D nanomaterials.
 - Improved the homogeneity of nanoparticles deposition via a vibration and ultrasonication method.
 - Developed a new programmable and scalable method to realize arbitrary freeform 3D manufacturing of 0D/1D/2D nanomaterials via rapid extrusion of hydrated gel precursors, offering deterministic control of the nano-to-macro structures spanning multiple length scales.

Master's Degree Research

Department of Chemical & Biomedical Engineering, USF

Sep 2016 – May 2018

Tampa, FL

- Replaced oxygen in graphene-based cobalt oxygen with nitrogen and successfully improved its catalytic performance in oxygen reduction reaction (ORR).
- Synthesized numerical mesoporous tungsten oxide powders using sol-gel method under different calcination/annealing temperatures to find the relation between temperature and electrochemical performance.
- Conducted research on separation and determination of Fe/Zn cations in serum with single-column Ion Chromatography.
- Applied the isotope labeling method to detect concentration of iron in blood for disease analysis.

Non-noble Metal Nanomaterial and Its Application in Electrocatalysis

National Synchrotron Radiation Laboratory, USTC

Dec 2015 – Jun 2016

Hefei, China

- Used several compound modes to dope Co, N and P atoms with graphene to verify the effects of N-doped active site, Me-Nx active site and NP coactivate site.
- Investigated the possibility of activating two or more active sites on graphene.

Exploration of the Graphene's Properties Exposed to α -rays

Advanced Carbon Laboratory, USTC

Jul 2015 – Nov 2015

Hefei, China

- Responsible for theoretical calculation, sample preparation and characterization analysis.

PUBLICATIONS

Zhewen Yin, Jingzhe Qiao, Nathan Grimes, Ossie Douglas, Daiyue Wei, Huijuan Zhao, Michael Cai Wang. Scalable Nanomanufacturing of Highly-uniform 2D Nanoribbons Via Controlled Fracture. *Pending*.

Zhewen Yin, Wyatt Panaccione, Anjun Hu, Ossie R. T. Douglas, Md Rubayat-E Tanjil, Yunjo Jeong, Huijuan Zhao, Michael Cai Wang. Directionally-Resolved Phononic Properties of Monolayer 2D Molybdenum Ditelluride (MoTe_2) under Uniaxial Elastic Strain. *Nano Letters*, 2023.

Mauricio E. Arias, Charlotte J. Haberstroh, **Zhewen Yin**, Michael Cai Wang. Effects of urban runoff and hydrological seasonality on plastic transport in the Hillsborough River. *Florida Scientist*, 2023.

Md Rubayat-E Tanjil, Tanuj Gupta, Matthew T Gole, Keegan P Suero, **Zhewen Yin**, Donald J McCleary, Ossie R T Douglas, Maegen M Kincanon, Nicholas G Rudawski, Alissa B Anderson, Catherine J Murphy, Huijuan Zhao, Michael Cai Wang. Nanoscale goldbeating: Solid-state transformation of 0D and 1D gold nanoparticles to anisotropic 2D morphologies. *PNAS nexus*, 2023.

Matthew T. Gole*, **Zhewen Yin***, Michael Cai Wang*, Wayne Lin, Ziran Zhou, Juyoung Leem, Satoshi Takekuma, Catherine J. Murphy, SungWoo Nam. Large Scale Self-assembly of Plasmonic Nanoparticles on Deformed Graphene Templates. *Scientific Reports*, 2021.

Charlotte J. Haberstroh, Mauricio E. Arias, **Zhewen Yin**, Michael Cai Wang. *Effects of Urban Hydrology on Plastic Transport in a Subtropical River*. *ACS ES&T Water*, 2021.

Charlotte J. Haberstroh, Mauricio E. Arias, **Zhewen Yin**, Ty Sok, Michael Cai Wang. Plastic Transport in A Complex Confluence of the Mekong River in Cambodia. *Environmental Research Letters*, 2021.

Charlotte J. Haberstroh, Mauricio E. Arias, **Zhewen Yin**, Michael Cai Wang. Effects of Hydrodynamics on the Cross-Sectional Distribution and Transport of Plastic in an Urban Coastal River. *Water Environment Research*, 2020.

Swetha Ramani, **Zhewen Yin**, Bradley Miller, Venkat R Bhethanabotla, John N Kuhn. Engineering Surface and Morphology of La/WO_3 for Electrochemical Oxygen Reduction. *CrystEngComm*, 2020.

Md Rubayat-E Tanjil, Yunjo Jeong, **Zhewen Yin**, Wyatt Panaccione, Michael Cai Wang. Ångström-Scale, Atomically Thin 2D Materials for Corrosion Mitigation and Passivation. *Coatings*, 2019.

PATENTS

Zhewen Yin, Michael Cai Wang, Huijuan Zhao. Scalable nanomanufacturing of atomically-thin, highly-aligned, high-aspect-ratio, homochiral nanoribbons, nanowires, and quantum wires with angstrom-precise morphology. *WO patent*, #WO2025015336A1.

Zhewen Yin, Michael Cai Wang. Method for heat exchange/pumping using elastocaloric/mechanocaloric/thermoelastic nanoscale two-dimensional (2D) materials. *U.S. provisional patent application filed*, #63/500,898.

PRESENTATIONS

Zhewen Yin, Daiyue Wei, Ossie Douglas, Muhammad Shabaz Rafique, Huijuan Zhao, Michael Cai Wang. Scalable Nanomanufacturing of Highly-Uniform, Atomically-Thin 2D Nanoribbons With Ångström-Precise Edge Chirality. *International Mechanical Engineering Congress & Exposition (IMECE)*, 2024, Portland, OR.

Zhewen Yin, Ossie Douglas, Daiyue Wei, Muhammad Shahbaz Rafique, Huijuan Zhao, Michael Cai Wang. Scalable Nanomanufacturing of Highly-Uniform, Atomically-Thin 2D Nanoribbons with Ångström-Precise Edge Chirality. *The Minerals, Metals & Materials Society (TMS) Annual Meeting & Exhibition*, 2024, Orlando, FL.

Zhewen Yin, Anjun Hu, Md Rubayat-E Tanjil, Ossie Douglas, Mahabubur Rahman, Huijuan Zhao, Michael Cai Wang. Strain-induced Reversible Phase Transitions in 2D Transition Metal Dichalcogenides (TMDCs). *The Minerals, Metals & Materials Society (TMS) Annual Meeting & Exhibition*, 2022, Anaheim, CA.

Zhewen Yin, Sankha Mukherjee, Yunjo Jeong, MdRubayat-E Tanjil, Chandra Veer Singh, Michael Cai Wang. Elastocaloric Effects via Strain-induced Phase Transitions in Nanoscale 2D Materials for Next Generation Solid-State Cooling and Refrigeration Technologies. *The Minerals, Metals & Materials Society (TMS) Annual Meeting & Exhibition*, 2020, San Diego, CA.

Zhewen Yin, Wyatt Panaccione, Xiaohe Luan, Yunjo Jeong, Md Rubayat-e Tanjil, Michael Cai Wang. Freeform Advanced Manufacturing of 0D/1D/2D Nanomaterials into 3D Architectures towards Tunable Properties. *International Mechanical Engineering Congress & Exposition (IMECE)*, 2019, Salt Lake City, UT.

Zhewen Yin, Wyatt Panaccione, Xiaohe Luan, Yunjo Jeong, Md Rubayat-e Tanjil, Michael Cai Wang. Freeform Advanced Manufacturing of 0D/1D/2D Nanomaterials into 3D Architectures with Tunable Properties. *NanoFlorida International Conference*, 2019, Tampa, FL.

Zhewen Yin, Charlotte J Haberstroh, Mauricio E Arias, Michael Cai Wang. Plastic Pollution in Rivers – Challenges and Opportunities of MicroRaman Spectroscopy for Characterization. *NanoFlorida International Conference*, 2019, Tampa, FL.

TECHNICAL SKILLS

Research Tools/Skills E-beam lithography, photolithography, Electron Microscopy (TEM & SEM), electron diffraction spectroscopy (EDS), atomic force microscopy (AFM), Raman spectroscopy, ultraviolet–visible spectroscopy (UV-Vis), Fourier transform infrared spectroscopy (FTIR), e-beam/thermal evaporator, reactive ion etching (RIE), molecular-beam epitaxy system (MBE), optical/stylus profilometer, X-ray diffraction (XRD), chemical vapor deposition (CVD), ion chromatography system, freeze dryer, laser cutter, 3D printing.

Software Origin, Gwyddion, Klayout, MDI Jade, KnowItAll, Bruker DIFFRAC, Highscore, ANSYS, AutoCAD, SolidWorks, ImageJ, Chromeleon.