

**Mehrshad Mehboudi**  
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**Education**

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Jan 2015 - May 2018	Ph.D. in Microelectronics-Photonics (Computational Material Science)	University of Arkansas, Fayetteville, AR.
Aug 2016 – Aug 2012 – Dec 2014	M.S. in Statistics and Analytics M.S. in Microelectronics-Photonics	University of Arkansas, Fayetteville, AR. University of Arkansas, Fayetteville, AR.
Sep 2004 – June 2007	M.S. in Mechanical Engineering	Iran University of Science and Technology, Tehran, Iran.
Sep 2000 – Aug 2004	B.S. Mechanical Engineering	University of Tehran, Tehran, Iran.

**Research and Industrial Work Experience**

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Aug 2012-May 2018	<b>Graduate Student</b> , Institute for Nanoscience and Engineering, University of Arkansas, Fayetteville, AR, USA. <ul style="list-style-type: none"><li>• Predicting structural phase transition, optoelectronic, piezoelectric, pyroelectric and photostriction properties in two-dimensional group IV-VI compounds.</li><li>• Two-dimensional disorder in monolayers of black phosphorus and group IV-VI compounds.</li><li>• Strain and the optoelectronic properties of nonplanar phosphorene monolayers.</li></ul>
Jun 2010-Aug 2012	<b>Mechanical Engineer</b> , MapnaBoiler Co. (power plants boiler manufacturing company) <ul style="list-style-type: none"><li>• Pressure vessel, integral pipes, and headers design according to ASME Sec. I &amp; Sec. VIII. Div.1. Providing the bill of materials. (B.O.M) for pressure vessels, pipes and tubes of Heat Recovery steam generators (HRSG).</li><li>• Designed and reviewed of static equipment EPC contractors' documents including, datasheets, fabrication drawings, and calculations.</li></ul>
Jan 2009-Jun 2010	<b>R&amp;D Engineer</b> , ATBIN and ATRA (industrial furnaces and ovens manufacturer) <ul style="list-style-type: none"><li>• Finite element analysis of combustion, heat transfer and fluid flow of furnaces, and industrial ovens to increase the performance of the furnace and provide a uniform heat treatment to the products.</li><li>• Designed and supervised the manufacturing of heat treatment furnaces for steel industries.</li></ul>

**Teaching Experience**

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Spring 2018	<b>Teacher Assistant</b> . <i>Differential Equation and Linear Algebra</i> . University of Arkansas Department of Mathematical Sciences. Tutored and prepared class materials and solution to homeworks and tests.
Fall 2017	<b>Lab and Drill Instructor</b> . <i>College Physics I lab and drill</i> . University of Arkansas, Physics Department. Led two sections of lab in which I gave a short lecture over that week's lab, oversaw student performance of the lab, and graded lab worksheets. Led three sections of drill in which I gave worksheets to students and help them solve the worksheets in groups.
Spring 2017	<b>Visiting Instructor</b> , <i>Static, and Fluid Mechanics</i> . Arkansas Tech. University, Mechanical Engineering Department. Led two sections of classes in which I prepared lecture materials,

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homework problems, solutions and evaluated students.

Summer 2016	<b>Drill Instructor.</b> <i>College Physics.</i> University of Arkansas, Physics Department. Led three sections of drill in which I gave worksheets to students and help them solve the worksheets in groups.
Spring and Fall 2015	<b>Teacher Assistant.</b> <i>Analytical Mechanics and Modern Physics.</i> University of Arkansas Physics Department. Tutored and prepared class materials and solution to homeworks and tests.
Fall 2014	<b>Lab Instructor.</b> <i>University Physics I lab.</i> University of Arkansas, Physics Department. Led two sections of lab in which I gave a short lecture over that week's lab, oversaw student performance of the lab, and graded lab worksheets.
Fall 2013 and spring 2014	<b>Teacher Assistant.</b> <i>University Physics I and II.</i> University of Arkansas Physics Department. Tutored and prepared class materials and solution to homeworks and tests.
Spring 2013	<b>Teacher Assistant.</b> <i>Thermal Physics.</i> University of Arkansas Physics Department. Tutored and prepared class materials and solution for homeworks and tests.

**Selected Peer-Reviewed Publications**

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- **Mehboudi, M.,** Utt, K., Terrones, H., Harriss, E.O., SanJuan, A.A.P. and Barraza-Lopez, S., 2015. Strain and the optoelectronic properties of nonplanar phosphorene monolayers. *Proceedings of the National Academy of Sciences*, 112(19), pp.5888-5892.
- **Mehboudi, M.,** Dorio, A.M., Zhu, W., van der Zande, A., Churchill, H.O., Pacheco-Sanjuan, A.A., Harriss, E.O., Kumar, P. and Barraza-Lopez, S., 2015. Two-dimensional disorder in black phosphorus and monochalcogenide monolayers. *Nano Letters* 16 (3), 1704-1712.
- **Mehboudi, M.,** Fregoso, B. M., Yang, Y., Zhu, W., van der Zande, A., Ferrer, J., & Barraza-Lopez, S. (2016). Structural phase transition and material properties of few-layer monochalcogenides. *Phys. Rev. Lett.* 117, 246802.
- Utt, K.L., Rivero, P., **Mehboudi, M.,** Harriss, E.O., Borunda, M.F., Pacheco SanJuan, A.A. and Barraza-Lopez, S., 2015. Intrinsic defects, fluctuations of the local shape, and the photo-oxidation of black phosphorus. *ACS Central Science*, 1(6), pp.320-327.
- Pacheco Sanjuan, A.A., **Mehboudi, M.,** Harriss, E.O., Terrones, H. and Barraza-Lopez, S., 2014. Quantitative chemistry and the discrete geometry of conformal atom-thin crystals. *ACS nano*, 8(2), pp.1136-1146.
- Haleoot, R., Paillard, C., Kaloni, T. P., **Mehboudi, M.,** Xu, B., Bellaiche, L., & Barraza-Lopez, S. (2017). Photostrictive two-dimensional materials in the monochalcogenide family. *Physical Review Letters*, 118(22), 227401.
- Yap, W. C., Yang, Z., **Mehboudi, M.,** Yan, J. A., Barraza-Lopez, S., & Zhu, W. (2017). Layered material GeSe and vertical GeSe/MoS<sub>2</sub> pn heterojunctions. *Nano Research*, 1-11.

**Selected Presentations**

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- Ground state degeneracy, energy barriers, and molecular dynamics evidence for two-dimensional disorder in black phosphorus and monochalcogenide monolayers at finite temperature. **Mehboudi, M.**, Barraza-Lopez, S., Dorio, A. M., Zhu, W., van der Zande, A., Churchill, H. O., & Kumar, P. (2016). *APS Meeting*.
- The discrete geometry of conformal two-dimensional materials, **Mehboudi, M.**, Utt, K., Terrones, H., Pacheco, A., Harriss, E., & Barraza-Lopez, S.. Atoms dictating shape: (2015, March) *APS March Meeting*.
- Atoms dictating shape: The discrete geometry of conformal two-dimensional materials. **Mehboudi, M.**, Utt, K., Terrones, H., Pacheco, A., Harriss, E., & Barraza-Lopez, S. (2015, March). *APS March Meeting*.
- Two-dimensional disorder in black phosphorus and monochalcogenide monolayers at finite temperature. , **Mehboudi, M.**, Barraza-Lopez, S., Dorio, A. M., Zhu, W., van der Zande, A., Churchill, H. O., & Kumar, P. (2016). *Arkansas Academy of science*, (2016).
- Two-dimensional disorder in black phosphorus and layered monochalcogenides., Barraza-Lopez, S., **Mehboudi, M.**, Kumar, P., Harriss, E. O., Churchill, H. O., Dorio, A. M., & Pacheco SanJuan, A. A. (2016). *APS March Meeting*.

[https://scholar.google.com/scholar?hl=en&as\\_sdt=0%2C4&q=mehboudi+mehrshad&oq=](https://scholar.google.com/scholar?hl=en&as_sdt=0%2C4&q=mehboudi+mehrshad&oq=)

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**Award and Honors**

Best physics presentation, 100<sup>th</sup> Arkansas Academy of Science Meeting 2016  
Ranked 479 out of 150,000 applicants in Iran public universities entrance exam.

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**Selected Skills**

<b>Material Simulation</b>	Computational Simulation of Materials, Density Functional Theory, ab-initio molecular dynamics, classical molecular dynamics, Mechanical and electronic properties of two-dimensional materials. VASP, SIESTA, and QMCPack.
<b>Mechanical engineering Design</b>	Design of piping systems, Pressure vessel design based on ASME code section I and VIII.
<b>Programming:</b>	R, Python (Numpy, Pandas, Scipy, Scikit-Learn, etc.), MATLAB, Linux shell scripting, SAS, and FORTRAN.
<b>CFD and FEM</b>	ANSYS (stress analysis, heat conduction analysis), Fluent (heat and fluid flow, combustion analysis), design and analyze semiconductor fabrication process by Silvaco.
<b>Modeling and Drafting</b>	AutoCAD, and Solid Works, Autodesk Inventor
<b>Data Science</b>	Exploratory data analysis, classification, clustering analysis, regression, multivariate analysis, statistical inference, Bayesian Inference, Monte Carlo, Markov Chain.
<b>Microfabrication</b>	Hands on experience in microfabrication methods. CVD, Clean room, photolithography, deposition, etching, development, characterization. Experience in fabrication semiconductor devices.
<b>Time Series Analysis</b>	Moving average, Auto-regressive, ARIMA, Seasonal ARIMA, model selection
<b>Bayesian Statistics</b>	Monte Carlo, Markov Chain, Bayesian model selection, Bayesian model diagnostics

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**Exploratory Data Analysis** Pairs plot, Parallel coordinates, Andrews plot, Heatmap, Scatterplot, Boxplot, QQ plot,  
and Histogram

**Deep Learning** CNNs and RNNs, Tensor Flow