UNIVERSITY OF CALIFORNIA
UC RIVERSIDE | Materials Science and Engineering

FALL 2020 COLLOQUIUM SPEAKER

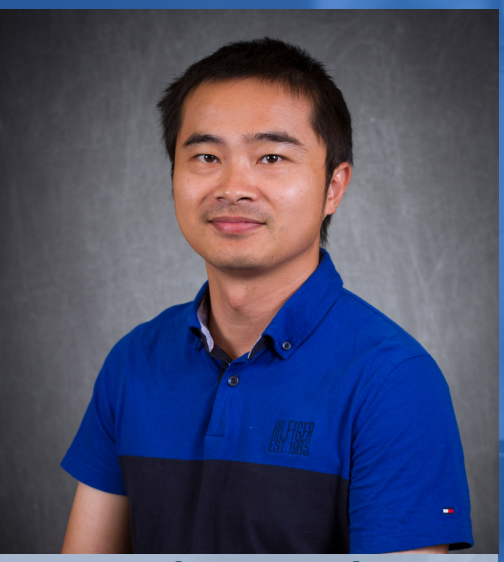
NOVEMBER 18, 2020

Wednesday's 1-1:50pm ZOOM

From Pentagonal Geometries to Two-Dimensional Materials

Two-dimensional (2D) materials hold a great potential as critical components of future generations of energy-efficient electronic devices such as quantum computers. Hexagons are the dominant building blocks adopted by nearly all of the promising 2D materials such as single-layer molybdenum disulphide and chromium triiodide exhibiting exotic electrical and magnetic properties, respectively. But these existing 2D materials have various issues like the absence of anisotropy and low critical magnetic ordering temperature associated with their hexagonal structure, hindering their wide applications. Addressing these issues requires a thorough exploration of the structure-property relationships of 2D materials. We have recently spent efforts in discovering and designing 2D materials (e.g., magnets) based on pentagonal geometries possessing intrinsic anisotropy. From the tessellation point of view, there are 15 types of convex pentagons discovered so far capable of tiling a gapless plane. Namely, any of these 15 types of pentagonal can be adopted as the crystal structure of a 2D material. In this talk, I will show several examples of 2D materials with pentagonal structure, which are predicted to possess a variety of attractive properties from being an antiferromagnetic and semiconducting to the rare coexistence of ferromagnetic ordering and piezoelectricity.

ZOOM MEETING ID 967 5468 5049 | **PASSWORD: 495951**



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Dr. Houlong Zhuang is currently an Assistant Professor in Aerospace and Mechanical Engineering in the School for Engineering of Matter, Transport and Energy at Arizona State University. He obtained his doctorate in Materials Science and Engineering at Cornell University in 2014. He worked as a postdoctoral researcher at Oak Ridge National Laboratory from 2014-2015, and as a postdoctoral fellow at Princeton University from 2015-2017. He was trained as a theoretical and computational materials scientist in various fields of materials science and engineering, especially in energy-related areas including catalysis, lightweight metal alloys, two-dimensional materials, and solid/liquid interfaces. His research experience has led to more than 80 peer-reviewed papers, with publications in journals such as Science Advances, Acta Materialia, Physical Review Materials, Physical Review B, and APL Materials. According to Google Scholar, his publications have been cited more than 5,000 times so far. Dr. Zhuang currently serves as an editor of the journal Materials Today Communications.

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