**Yuhang Cai**

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**Education**

**Nanjing University Nanjing, China**

*Bachelor of Science in Physics* *Sep.2014-Jun.2018 (expected)*

* **The National Basic Discipline Elite Program**
* **GPA:** 4.553/5.0 (91.06/100); **GPA Ranking:** 6/201

**University of Illinois Urbana-Champaign Champaign, IL**

*Student Intern* *Jul.2017-Jan.2018*

**Research Experience**

**Micro and Nanotechnology Laboratory, University of Illinois Urbana-Champaign**

* **Topic: *Synthesis of two-dimensional transition metal dichalcogenides for electronic and photonic devices***

*Student Intern*, Advisor: Prof. Wenjuan Zhu *Jul.2017-Jan.2018*

* Grew monolayer WSe2, MoS2 triangles (both 100 micros) and large domains of MoS2, respectively, on SiO2 substrates via chemical vapor deposition (CVD) and then optimized reaction conditions
* Deposited monolayer MoS2 and WSe2 triangles on sapphire by CVD
* Characterized as-grown films by Atomic Force Microscope(AFM), raman spectroscopy and photoluminescence spectroscopy (PL)
* Utilized two-step CVD method to grow MoS2 on the top surface of WSe2, and processed the epitaxial growth of WSe2 on the MoS2 in the same method
* Identified the lateral heterostructures of MoS2/WSe2 and WSe2/MoSe2 (Selenization of MoS2)
* Synthesized monolayer MoS2 (n-type) directly on p-doped Si and WSe2 (p-type) on n-doped Si substrates for a p-n junction, also grew MoS2 on n-type Si and WSe2 on p-type Si substrates (for Dr. Xu’s Research)
* Achieved growth of two-dimensional MoTe2 on SiO2/Si substrate

**National Laboratory of Solid State Microstructures, Nanjing University**

* **Topic:** ***Quantum transport in two-dimensional layered topological insulators***

*Independent Researcher*, Advisor: Prof. Fengqi Song *Sep.2016-May.2017*

* Prepared BiSbTeSe (BSTS) films by the Bridgman-Stockbarger method, and the films were mechanically exfoliated by a kind of special tape with weak adhesion
* Generated patterned electrodes through photolithographic process and gold plating technique (magnetron sputtering), and then characterized as-obtained products.
* Performed transport measurements in different magnetic fields and different temperatures
* Calculated the electron mobility, electron number density and phase coherence length, etc. by using the classical fitting method
* **Topic: *Design of a simple field emission microscopy (FEM)***

*Team Work*, Advisor: Prof. Xiaoshan Wu *Mar.2015-Jun.2015*

* Fabricated tip with small radius via the electrochemical corrosion method
* Designed circuits and embedded the tip in the picture tube of a small television; eventually made a simple FEM for the purpose of studying the principle of field emission

**Journals**

[1] **Yuhang Cai**, Kai Xu, and Wenjuan Zhu. Large-area Growth of Mos2 and Wse2 on SiO2/Si and Sapphire Substrate, in preparation.

**Conferences & Exhibitions**

[1] **Yuhang Cai**, Kai Xu, and Wenjuan Zhu. Lateral WSe2/MoSe2 Heterostructures Grown by a Two-step CVD Method, 2018, APS March Meeting. [[Abstract](http://meetings.aps.org/Meeting/MAR18/Session/T60.161)]

[2] Kai Xu, **Yuhang Cai**, Zijing Zhao, and Wenjuan Zhu. Esaki Diodes based on MoS2/p-Si Heterostructures, 2018, APS March Meeting. [[Abstract](http://meetings.aps.org/Meeting/MAR18/Session/X37.3)]

[3] Jaron A. Kropp, **Yuhang Cai**, Zihan Yao, Dr. Wenjuan Zhu, and Dr. Theodosia Gougousi. Surface functionalization of monolayer MoS2 for atomic layer deposition using gold chloride salts, 2017, AVS 64th International Symposium & Exhibition. [PDF]

**Honors & Awards**

First Prize, Elite Program Scholarship *Nov.2017*

Second Prize, People’s Scholarship *Nov.2017*

Second Prize, Elite Program Scholarship *Nov.2016*

Second Prize, People’s Scholarship *Nov.2016*

First Prize, Xing Quan Scholarship (2%) *Nov.2015*

First Prize, Elite Program Scholarship (2%) *Nov.2015*

**Professional Skills**

**Computer Competencies:** C language, Python, Matlab, Origin

**Techniques and Instrumentation:** Photolithography, magnetron sputtering, ALD, SEM, AFM, Transport Measurement, Ferroelectric measurement, CVD furnaces