Fufei An

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SUMMARY

Microfabrication and semiconductor process engineer with a Ph.D. in Materials Science and Engineering and 6+ years of hands-on cleanroom experience developing thin-film micro/nanoelectronic devices. Strong background in process integration, lithography, etching, deposition, in-process metrology, electrical characterization, failure analysis, statistical data analysis, and technical documentation for research and production environments.

EDUCATION

University of Illinois at Urbana-Champaign (UIUC) Aug.2018-May.2024
Ph.D. in Materials Science and Engineering *Advisor: Qing Cao*

Shanghai Jiao Tong University (SJTU) Sep.2014-Jun.2018
Bachelor of Engineering in Materials Science and Engineering

PROFESSIONAL EXPERIENCE

Analog Devices, Inc. May.2024-Present
Senior Engineer, Product Engineering (Mfg.) *Global Operations & Technology*

- Manage 180 nm semiconductor product sustaining activities, using yield, test-time, quality, statistical analysis, and failure analysis data to drive product margin, performance, and cost improvements
- Support new product introduction and production ramp activities through cross-functional collaboration with design, test, manufacturing, quality, and operations teams
- Perform fault isolation and physical failure analysis using nanoprobing, EBIC, PVC, plasma-FIB cross-sections, SEM and STEM, OBIRCH and EMMI, LIT, wet chemical staining, and mechanical polishing

University of Illinois at Urbana-Champaign (UIUC) Aug.2018-May.2024
Graduate Research Assistant, Materials Science and Engineering *Qing Cao Research Group*

- Designed and fabricated 2D-semiconductor thin-film test structures with ultrathin carbon-dot interfacial layers and high-κ oxide dielectrics
- Developed process modules and integration flows combining mask-aligner and maskless photolithography, electron-beam lithography, wet/dry etching, RIE/ICP-RIE, ALD/PECVD, oxidation, metal deposition
- Performed in-process metrology, electrical testing, and materials characterization to diagnose interfacial defects and connect fabrication parameters with device performance
- Analyzed experimental data with Python, Matlab, and OriginLab; communicated results through peer-reviewed publications, patent applications, conference presentations, and detailed technical reports

SKILLS

Microfabrication and Process Integration: Thin-film device fabrication, cleanroom process development, photolithography, Heidelberg maskless lithography, electron-beam lithography (Raith and Elionix), wet etching with HF/BOE/TMAH, RIE/ICP-RIE, wet/dry oxidation, e-beam evaporation, sputtering, thermal evaporation, ALD, PECVD, and KLayout-based layout work

Metrology, Characterization, and Failure Analysis: Nanoprobing/EBIC, micromanipulator probe station with Keysight EasyExpert, dual-beam PVC, plasma-FIB X-section SEM/STEM, TEM, OBIRCH/EMMI, lock-in IR thermography (LIT), wet chemical staining, mechanical polishing, AFM, Raman, TGA, XRD, XPS, FTIR, etc.

Experimental Design and Data Analysis: Process-performance correlation, yield and test-time analysis, data collection and retention, statistical analysis, study reports, technical documentation, Python, Matlab, OriginLab, Klarity ACE, Data Suite, Exensio, and Avalon

Additional Tools: LabVIEW, DigitalMicrograph, Solidworks, Photoshop, Blender, and Microsoft Office

SELECTED AWARDS

Editors' Choice 2024 from Communications Engineering *Jan.2025*
Mavis Future Faculty Fellows by the Grainger College of Engineering (2023-2024) *Apr.2023*
PPG-MRL Graduate Research Assistantship at the Materials Research Laboratory *Dec.2021*
Undergraduate Overseas Research Scholarship *Oct.2017*

PUBLICATIONS

- Sunny Wong[1], **Fufei An**[1], Yu Wu, Viet-Hung Pham, Yanxiao Li, Robert Thompson, Junseok Lee, Kaijun Yin, Yuan Gao, Jian-Min Zuo, Congjun Wang, Christopher Matranga, and Qing Cao*. Integration of ultrathin high-κ oxide on two-dimensional semiconductors with atomically thin carbon-dot assembly as van der Waals interfacial layer. *Submitted to Nature Communications; Under revision.*
- Hsien-Nung Wang[1], **Fufei An**[1], Cindy Wong, Kaijun Yin, Jiangnan Liu, Yihan Wang, Jian-Min Zuo, Andre Schleife, and Qing Cao*. Solution-processable ordered defect compound semiconductors for high-performance electronics. *Science Advances 10, eadr8636 (2024),* ***Feature Article of Science Advances****.*
- **Fufei An**, C.Wang, V.H.Pham, A.Borisevich, J.Qian, K.Yin, S.Pidaparthy, B.Robinson, A-S.Chou, J.Lee, J.Weidman, S.Natesakhawat, H.Wang, A.Schleife, J-M.Zuo, C.Matranga, and Q.Cao*. Ultrathin quasi-2D amorphous carbon dielectric prepared from solution precursor for nanoelectronics. *Communications Engineering 2, 93 (2023),* ***Editors' Choice 2024****.*
- Jinsong Cui, **Fufei An**, Jiangchao Qian, Yuxuan Wu, Luke L. Sloan, Saran Pidaparthy, Jian-Min Zuo, Qing Cao*. CMOS-Compatible and Scalable Electrochemical Synaptic Transistor Arrays for Deep-Learning Accelerator. *Nature Electronics (2023): 1-9.*
- Yi Zhang, Jinsong Cui, Kuan-Yu Chen, Shanny H. Kuo, Jaishree Sharma, Rimsha Bhatta, Zheng Liu, Austin Ellis-Mohr, **Fufei An**, Jiahui Li, Qian Chen, Kari D. Foss, Hua Wang, Yumeng Li, Annette M. McCoy, Gee W. Lau, Qing Cao*. A Smart Coating with Integrated Physical-Antimicrobial and Strain-Mapping Functionalities for Orthopaedic Implants. *Science Advances 9, eadg7397 (2023).*
- Yadong Xu[1], Ganggang Zhao[1], Liang Zhu, Qihui Fei, Zhe Zhang, Zanyu Chen, **Fufei An**, Yangyang Chen, Yun Ling, Peijun Guo, Shinghua Ding, Guoliang Huang, Pai-Yen Chen, Qing Cao, Zheng Yan. Pencil–paper on-skin electronics. *Proceedings of the National Academy of Sciences 117-31(2020):18292-18301.*
- **Fufei An**[1], Li, Yao[1], Haoran Wu, Shenmin Zhu, Chenyangzi Lin, Mengdan Xia, Kun Xue, Di Zhang, and Keryn Lian. A $NiCo_2S_4$/hierarchical porous carbon for high performance asymmetrical supercapacitor. *Journal of Power Sources 427(2019): 138-144.*
- Li, Yao[1], Mengdan Xia[1], **Fufei An**, Nianfang Ma, Xueliang Jiang, Shenmin Zhu, Dawei Wang, and Jun Ma. Superior removal of Hg (II) ions from wastewater using hierarchically porous, functionalized carbon. *Journal of hazardous materials 371(2019): 33-41.*
- Sun, Du[1], Yunfei Wang[1], Kenneth JT Livi, Chuhong Wang, Ruichun Luo, Zhuoqun Zhang, Hamdan Alghamdi, Chenyang Li, **Fufei An**, Bernard Gaskey, Tim Mueller, and Anthony Shoji Hall*. Ordered Intermetallic Pd_3Bi Prepared by an Electrochemically Induced Phase Transformation for Oxygen Reduction Electrocatalysis. *ACS nano 13, no.9(2019): 10818-10825.*

PATENT APPLICATIONs

- Qing Cao, **Fufei An**, Christopher Matranga, Congjun Wang, Viet Hung Pham. "2D amorphous carbon film assembled from graphene quantum dots" *U.S. Patent Application No. 21-0366-US-PRO*

CONFERENCE AND PRESENTATIONS

- **Fufei An**, Qing Cao. "Ultrathin Quasi-2D Amorphous Carbon Dielectric prepared from Solution Precursor for Nanoelectronics", *2024 MRS Spring Meeting.*
- Congjun Wang, Viet Hung Pham, **Fufei An**, Christopher Matranga, Qing Cao. "Solution Processible Carbon Precursors for 2D Amorphous Carbon Dielectric", *The Materials Science & Technology (MS&T) technical meeting and exhibition (2022).*