BO LU

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OBJECTIVE

A full time position as a MEMS Design Engineer, MEMS Technology Engineer or MEMS Fabrication Engineer

HIGHLIGHTS

- 6 years' experience in design and testing of micro-gyroscopes and biomedical MEMS devices
- 3+ years' experience in finite-element simulation using ANSYS and Comsol Multiphysics, creating a new method of modeling the performance of micro gyroscopes in the presence of fabrication imperfections
- 5 years' hands-on cleanroom experience in semiconductor and polymer processing
- Equipment 'superusers' to maintain the machines, and give trainings and qualifications to the other junior users
- Solid understanding of IC/Semiconductors, MEMS technologies, and sensors & actuators
- Have published more than 15 papers on the most prestigious MEMS conferences and high impact factor journals; Issued 5 patents; Assisted in writing proposals (million $) and annual reports for three projects

EDUCATION

- Ph.D. in Electrical Engineering , California Institute of Technology, USA *Expected: Jun 2012*
  - *GPA: 4.3/4.3 (Advisor: Dr. Yu-Chong Tai)*
- B.S. in Microelectronics, Peking University, China *Sep 2003-Jul 2007*
  - *GPA: 3.83/4.00 (Advisor: Dr. Guizhen Yan)*

AWARDS

- 2007~2008: Division Fellowship (Caltech)
- 2007: The top ten excellent undergraduate thesis (Peking Univ.)
- 2005~2006: Dean's Award of Excellent Student in Academy, Moral and Health (Peking Univ.)
- 2004~2005: May Fourth Scholarship (Peking Univ.) & Dean's Awards for Study Excellence (Peking Univ.)
- 2003~2004: Canon Scholarship, Canon Co. & Dean's Awards for Study Excellence (Peking Univ.)

TECHNICAL SKILLS

- ***Processing:*** photolithography with stepper and contact aligner, evaporation (thermal and e-beam evaporators), polymers (parylene and PDMS), wet etching, dry etching (plasma etcher, RIE and DRIE), mask layout design and fabrication, oxidation, dicing saw, laser machine, wire bonding, UV-Ozone machine
- ***Measurement:*** SEM, AFM, fluorescence microscopy, step profiler, goniometer, FTIR, XPS, fluorimeter, DMA
- ***Computing:*** ANSYS, Comsol Multiphysics, Matlab, Mathematica, LabVIEW, AutoCAD, C/C++, Cadence, PSpice

RELATED COURSES

Semiconductor Physics, Semiconductor Device Physics, Digital Integrated Circuits, Analog CMOS Integrated Circuits, Integrated Circuit Process, IC CAD Design, Microelectronic Packaging, VLSI and ULSI Technology, Semiconductor Sensors and Actuators, MEMS Technology and Devices, Fundamentals of Statistical Process Control (SPC)

RESEARCH

Biomedical microdevices for the therapy of age-related macular degeneration (AMD) *Apr 2010-present*

- Create the first parylene-C based microdevice as an artificial Bruch's membrane for the AMD therapy
- Lead the Caltech MEMS Group in close collaborations, discussion and teleconference communications with USC

Doheny Eye Institute, UCSB Center for Stem Cell Biology and Engineering, and the Geron Corporation

- Create the first parylene/SU-8 microfluidic implantation tool to facilitate the surgical process

Microfiltration devices for the detection of circulating tumor cells (CTC) for early cancer diagnosis *May 2008-present*

- Create various parylene-C based membrane filtration devices with high performance and low cost
- Optimize the fabrication and production yield of microfilters, and play a crucial role in the commercialization of microfilters, which are currently used in many research institutes and hospitals in US and Europe
- Lead the Caltech MEMS Group in close collaborations with USC Cancer Center and the Tronics Corporation

Parylene-based superhydrophobic films *May 2010-present*

- Design and fabricate the first parylene based superhydrophobic thin films for surface microfluidics applications
- The first characterizations of parylene surfaces under various plasma treatments by AFM and SEM

Characterization of thin parylene film *May 2008-present*

- The first study of the autofluorescence and optical properties of parylene-C, -D, -N, -HT and -AM
- The first measurement of the permeability of submicron parylene-C

Study of various micromachined gyroscopes *Feb 2006-Jul 2007*

- Contribute to the design and fabrication of several micro-gyroscopes
- Create a new modeling and simulation method to evaluate the performance of micro-gyroscopes under fabrication imperfections using ANSYS and SIMULINK, and the failure analysis of the gyroscopes
- Design a circuit to demodulate the driving and sensing signals during gyroscope operation

SELECTED PUBLICATIONS

1. **B. Lu** *et al.*, “A 3D parylene scaffold cage for culturing retinal pigment epithelial cells”, *Proc. of MEMS 2012*.
2. **B. Lu** *et al.*, “Semipermeable parylene membrane as an artificial Bruch's membrane”, *Proc. of Transducers 2011.*
3. **B. Lu** *et al.*, “Time-dependent cell membrane damage under mechanical tension: experiments and modeling”, *Proc. of Transducers 2011.*
4. **B. Lu** *et al.*, “Ultrathin parylene-C semipermeable membranes for biomedical applications”, *Proc. of MEMS 2011.*
5. **B. Lu** *et al.*, “Highly flexible, transparent and patternable parylene-C superhydrophobic films with high and low adhesion”, *Proc. of MEMS 2011.*
6. **B. Lu** *et al.*, “The capture and 3-D culture of viable circulating tumor cells using high open-factor parylene-C/HT membrane filters”, *Proc. of Hilton Head 2010.*
7. **B. Lu** *et al.*, “Parylene membrane slot filter for the capture, analysis and culture of viable circulating tumor cells”, *Proc. of MEMS 2010*.
8. **B. Lu** *et al.*, "Parylene background fluorescence for BioMEMS applications", *Proc. of Transducers 2009.*
9. **B. Lu** *et al.*, “Mesh-supported submicron parylene-C membranes for culturing retinal pigment epithelial cells”, *Biomedical Microdevices*, DOI: 10.1007/s10544-012-9645-8, 2012. (IF=3.386)
10. **B. Lu*** *et al.*, “A cancer detection platform which measures telomerase activity from live circulating tumor cells captured on a microfilter”, *Cancer Research*, vol. 70, pp. 6420-6426, 2010. (*equal first authors) (IF=8.234)
11. **B. Lu** *et al.*, “A study of the autofluorescence of parylene materials for microTAS applications”, *Lab on a Chip*, vol. 10, pp. 1826-1834, 2010. (IF=6.306)
12. **B. Lv*** *et al.*, “Simulation of a novel lateral axis micromachined gyroscope in the presence of fabrication imperfections”, *Microsystem Technologies*, vol. 14, pp. 711-718, 2008. (*Lu can also be spelt as Lv) (IF=1.069)
13. **B. Lu** *et al.*, “A method of simulating the decoupling property of lateral axis micro gyroscope using finite element tool”, *Chinese Journal of Sensors and Actuators*, vol. 21, pp. 255-257, 2008.