JIANYI DU

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Education Experience

M.S. in Mechanical Engineering   *Sept. 2016 - May 2018 (Expected)*
Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts, USA.

B.S. in Mechanical Engineering, with *Highest Distinction*   *Sept. 2014 - May 2016*
Purdue University (PU), West Lafayette, Indiana, USA.
GPA: 3.96/4.00 (Graduate-level courses: 4.00/4.00)

B.S. in Mechanical Engineering   *Sept. 2012 - June 2016*
Shanghai Jiao Tong University (SJTU), Shanghai, China.
GPA: 3.82/4.30 (89.4/100)   Rank: 6/56

Publications

Symposium Abstract:
- **Jianyi Du**, J. William Boley, and Rebecca K. Kramer, "Integrating Systems for Liquid/Substrate Characterization and Functional Printing" (August 6, 2015). *The Summer Undergraduate Research Fellowship (SURF) Symposium*. Paper 125. **(Published)**

Journals:
- Lenan Zhang, **Jianyi Du**, Xiaoshun Zhuang, Zhiliang Wang, and Jingyu Pei, "Geometric prediction of conic tool in micro-EDM milling with fix-length compensation using simulation", *International Journal of Machine Tools and Manufacture, February 2015*. **(Published)**
- Jingyu Pei, Lenan Zhang, **Jianyi Du**, Xiaoshun Zhuang, Zhaowei Zhou, Shunkun Wu, and Yetian Zhu, "A model of tool wear in electrical discharge machining process based on electromagnetic theory", *International Journal of Machine Tools and Manufacture*. **(Under review)**
- **Jianyi Du**, J. William Boley and Rebecca Kramer, "Automated calculation of contact angle for liquid-solid interfaces using extended generalized Hough Transform". **(Preprint available upon request)**

Professional Experience

Inkjetting/Direct Writing Printer for Liquid Metal   *Dec. 2014 - Present*
Research Assistant in Faboratory, School of Mechanical Engineering, PU   AD**: Rebecca Kramer**
- Individually designed and programmed a functional printer for inkjetting/direct writing micro-scale liquid metal (eGaIn) patterns to fabricate stretchable sensors (Framework: Solidworks; Front end: Python+Qt; Back end: C/C++, Arduino);
- Integrated graphical & vision & lighting modules into the software as a whole printing system, thus automating the printing process with controllable geometry;
- Improved the trace width consistency by introducing the dynamical control of the stages with a resolution of 2μm and surface customization of the printing nozzle;
- Conducted a series of test-printing to revise the previously published empirical characteristic matrix, and the printed traces showed less than 10% error in width for majority of cases.

Contact Angle Measurer for Sessile Drops   *May 2015 - Aug. 2015*
Research Fellowship in Faboratory, School of Mechanical Engineering, PU   AD: **Rebecca Kramer**
- Innovatively fit Bashforth-Adam equation into the sessile drop by extending Generalized Hough Transform to calculate the contact angles;
- Developed the graphical interface of the contact angle measurer (Front end: Python+Qt);
- Improved the algorithm accuracy by designing the iterative calculation, and the improved version produced results with less than 5% errors for 90% cases within 15 iterations;
- Implemented the measurer in the project to evaluate impact of eGaIn oxide layer on its surface tension;

Deep Learning Neural Network   *Oct. 2014 – Aug. 2015*
Research Intern in Teradeep, Inc   AD: **Eugenio Culurciello**
e-lab, School of Biomedical Engineering, PU
- Developed an efficient converter between two deep learning frameworks (torch/caffe) to evaluate their computing performance on the same neural network model, respectively (Python+Lua);
- Developed a series of video capturing toolkits (*video-framer & processor*) in Lua in an automotive project to retrieve the database for deep learning;
- Developed *vid2img* (video to image) tool in Lua to track and extract objects in the video for recognition;

Simulation of Electrical Discharge Machining (EDM) Process   *Apr. 2014 - Present*
(Part of **National Natural Science Foundation of China project** # E050902)   AD**: Jingyu Pei**
Research Assistant in The State Key Laboratory of Mechanical System & Vibration, SJTU
- Simulated the fix-length compensation milling with the established geometric model, and verified its accuracy with MATLAB for smaller layer thicknesses;
- Introduced the electric field distribution into the die-sinking and milling process in an attempt to physically account for the tool wear with more accuracy, and verified the simulation results in the experiments with a series of specially-designed electrodes;

Mars Rover Wheel-Ground Interaction   *Sept. 2013 - Jun. 2014*
(Part of **National Natural Science Foundation of China project** # F030601)   AD: **Qixin Cao**
Robotic Lab, School of Mechanical Engineering, SJTU
- Set up an experimental platform with Mars-like soil for single-wheel-ground interaction to measure the pressure force and the slipping ratio based on high-precision control of servo motor, step motor and electronic force gauge connected by Arduino;
- Designed a set of controlling rules for Mars rover to control the slipping ratio with reinforcement learning; the system by Simulink responded with less than 10% fluctuation and fast rising time;

Honors

16' Outstanding Undergraduate of Shanghai	*April 2016*
Bottomley Undergrad Research Scholar (Purdue University)	*Spring 2016*
Summer Undergraduate Research Fellowship (Purdue University**)**	*May 2015 - Aug. 2015*
Dean's List and Semester Honors (Purdue University**)**	*Fall 2014, Spring 2015*
SMC Corp. First-Class Scholarship (Top 3% SJTU**)**	*Sept. 2014*
Honorable Mention in US Mathematical Contest in Modeling 14'	*Feb. 2014*
First Prize in National Olympiads in Informatics in Provinces of China 11'	*Oct. 2011*

Responsibilities

Community volunteer in Kiwanis Circle K, Purdue University	*Feb. 2015 – Jan. 2016*
President in "Chun-Tsung Endowment"	*Apr. 2014 - Jun. 2015*
(Undergraduate Research Internship Students' Committee in SJTU)	
Volunteer in Shanghai International Marathon	*Sept. 2013*

Key Skills

- Programming: C/C++, Python, Qt, Lua, MATLAB, Arduino (Platform: Linux/Windows);
- Functional printing: Liquid metal inkjetting / direct-writing, and relevant sensor fabrication & testing;
- Surface physics: Fundamental liquid-solid interaction of liquid metal surface oxidation;
- Computational simulation: Simulation of manufacturing processes through numerical calculation and other softwares including Simulink;
- Image processing: Pattern recognition and fundamental computer vision to extract image information through state-of-the-art algorithms and designed algorithms;
- System control: Design and modelling of control system with desired parameters; hardware control of C843 board with customized response;
- Computer aided design (CAD): Solidworks, NX UG.