

John Yun Qiao

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Education

PhD Candidate, MS — Washington University in St. Louis, St. Louis, MO 2012 - Present
Biomedical Engineering GPA: 3.80/4.00

BS — Worcester Polytechnic Institute, Worcester, MA 2008 - 2012
Biomedical Engineering Major, Chemistry Minor. GPA: 3.82/4.00

Relevant Courses

Biomedical Signal Processing (MATLAB), Algorithm and Data Structure (C++), Biological Imaging Technology, Quantitative Bioelectricity and Cardiac Excitation, Quantitative Physiology (with TA experience), Mechanical Circulatory Support (CAD, CFD).

Research Experience

Animal Model of Sick Sinus Syndrome and Atrial Fibrillation 2013 - 2016

- Performed optical mapping to characterize atrial and ventricular conduction parameters of Langendorff-perfused hearts, including conduction velocity, action potential duration, conduction heterogeneity, and sinus node recovery time.
- Performed programmed stimulation to investigate susceptibility to atrial fibrillation.
- Developed MATLAB scripts to filter and analyze long-term telemetry ECG recordings for arrhythmia detection.

Relevant skills: understanding of atrial fibrillation mechanism, biomedical signal processing, phase mapping, animal experiment experience.

Heart on a Chip 2014 - Present

- Developed a testing platform for pharmacological agents and gene therapies using human cardiac tissue using microfluidic fabrication techniques.
- Prototyped device hardware using 3D printer, laser cutter, and 3 axis CNC milling machine.
- Designed and conducted experiments to study cardiotoxicity of common cancer drugs.
- Evaluated efficacy of optogenetic stimulation of human heart.
- Worked with university technology transfer office to draft and file a patent application.
- Worked closely with electrical engineers to develop circuits and C codes for device components.

Relevant skills: AutoCAD, C programming for microcontrollers, US patent application.

Biodegradable Wireless Pacemaker 2015 - Present

- Provided design inputs to electrical and biomaterials engineers based on understanding of clinical needs and limitations of different animal models.
- Designed and performed animal testing with different iterations of pacemaker.
- Analyzed functional data and evaluated pacemaker performance in animal models.

Relevant skills: effective teamwork with engineers of different backgrounds, medical device testing, understanding of cardiac electrophysiology of human and common animal models.

Leadership Experience

Directly supervised multiple undergraduate research assistants 2016 - Present

- Performance evaluation of a wireless optical stimulation device for optogenetic control of heart.
- Development of wireless ECG jacket for telemetry recording in mice.
- 3D printed chamber for ECG recording on conscious mice.
- Molecular response of human cardiac tissue to stress activators.

Publications

Y. Qiao, C. Lipovsky, S. Hicks, S. Bhatnagar, G. Li, A. Khandekar, R. Guzy, C. Nichols, I. Efimov, S. Rentschler. "Transient Notch Activation Induces Long-term Gene Expression Changes Leading to Sick Sinus Syndrome in Mice." *Circulation Research*. In submission.

C. Kang, A. Badiceanu, C. Gloschat, **Y. Qiao**, N. Trayanova, I. R. Efimov, "Isoprenaline modulates the contribution of delayed rectifier currents IKs and IKr in the human ventricle" *Circulation Research*. In preparation.

C. Kang, **Y. Qiao**, G. Li, K. Baechle, P. Camelliti, S. Rentschler, and I. R. Efimov. "Human Organotypic Cultured Cardiac Slices: New Platform For High Throughput Preclinical Human Trials." *Scientific Reports* 6 (2016).

R. Nadadur, M. Broman, B. Boukens, S. Mazurek, X. Yang, M. Boogaard, J. Bekeny, M. Gadek, T. Ward, M. Zhang, **Y. Qiao**, J. Martin, C. Seidman, J. Seidman, V. Christoffels, I. Efimov, E. McNally, C. Weber, I. Moskowitz. "Pitx2 modulates a Tbx5-dependent gene regulatory network to maintain atrial rhythm." *Science Translational Medicine* 8, no. 354 (2016).

Selected Conference Proceedings

Y. Qiao, C. Lipovsky, S. Hicks, S. Bhatnagar, G. Li, A. Khandekar, R. Guzy, C. Nichols, I. Efimov, S. Rentschler. "Transient Notch Activation Induces Long-term Gene Expression Changes Leading to Sick Sinus Syndrome in Mice." Leducq Foundation Meeting, December 2016 (Oral Presentation).

Y. Qiao, Q. Dong, C. Kang, B. Li, C. Miccile, Z. Li, I. Efimov. "Long-term Organotypic Culture of Human Cardiac Tissue." Biomedical Engineering Society Annual Meeting, October 2016 (Poster Presentation).

Y. Qiao, C. Lipovsky, A. Chiplunkar, B. Gillers, K. Holzem, B. Boukens, S. Rentschler, I. Efimov. "Notch-mediated Atrial Reprogramming Resembles Sick Sinus Syndrome." Heart Rhythm Society Annual Meeting, May 2015 (Oral Presentation).

Awards

Outstanding Poster Presentation , American Physiological Society, Washington, DC	2016
Rudy Scholarship Recipient , Washington University in St. Louis, St. Louis, MO	2012 - 2013
Member , Tau Beta Pi National Engineering Honor Society, Worcester, MA	2011 - 2012
Member , Alpha Eta Mu Beta National Biomedical Engineering Honor Society	2010 - 2012
International Scholarship , Worcester Polytechnic Institute, Worcester, MA	2008 - 2012
Presidential Scholarship , Worcester Polytechnic Institute, Worcester, MA	2008 - 2012
Dean's List , Worcester Polytechnic Institute, Worcester, MA	2008 - 2012