

## YULIANG XIE

Assistant Professor,

Roy J. Carver Department of Biomedical Engineering, University of Iowa;

Address: 5637 Seamans Center, Iowa City, IA, 52242;

Website: <https://xie.lab.uiowa.edu/>

Email: [yuliang-xie@uiowa.edu](mailto:yuliang-xie@uiowa.edu)

## EDUCATION

- 2010-2016 Ph.D. in Chemical Engineering, Pennsylvania State University, PA, USA.
- *Dissertation: Optoacoustic tweezers.*
- 2007-2010 M.Sc. in Biochemical Engineering, Zhejiang University, Hangzhou, China.
- *Thesis: Fabrication and characterization of NaCS/Chitosan layer-by-layer self-assembly complex membrane & microcapsules.*
- 2003-2007 B.Sc. in Biological Engineering, Zhejiang University, Hangzhou, China.  
B.Sc. in Chu Kochen Honors College, Zhejiang University, Hangzhou, China.

## PROFESSIONAL APPOINTMENTS

- 2020- Assistant Professor, Roy J. Carver Department of Biomedical Engineering, University of Iowa, IA, USA.
- 2016-2020 Research Associate, Howard Hughes Medical Institute, Carver College of Medicine, University of Iowa, IA, USA.
- *Advisor: Michael Welsh, M.D.*
- 2010-2016 Research Assistant, Department of Chemical Engineering, Penn State University, PA, USA.
- *Advisor: Tony Jun Huang, Ph.D.*
- 2007-2010 Research Assistant, Department of Chemical and Biological Engineering, Zhejiang University, Hangzhou, China.
- *Advisor: Shan-Jing Yao, Ph.D.*

## HONORS AND AWARDS

- 2014 Harold K. Schilling Dean's Graduate Scholarship, Penn State University.
- 2010 Excellent Graduate Student in Master degree, Zhejiang University.
- 2009 First Prize of Excellent Graduate Scholarship, Zhejiang University.
- 2009 Evonik Scholarship, Zhejiang University and Evonik Inc.
- 2008 Second Prize of Excellent Graduate Scholarship, Zhejiang University.
- 2008 Wenchixiang Scholarship for Excellent Graduate, Zhejiang University.
- 2008 Scholarship of Excellent Cadre of Graduate, Zhejiang University.

2007

Excellent Graduate in Bachelor degree, Zhejiang University.

## RESEARCH INTERESTS

Our research group centers on developing cutting-edge micro/nano devices to study lung physiology and pulmonary diseases, we interest in the follows fields:

- Develop lab-on-a-chip systems that integrate fluids, mechanics, and acoustics;
- Apply microfluidic methods to pathogenesis, diagnosis, and therapeutics of pulmonary disease;
- Investigate mucus production, regulation, and host defense function;
- Translate scientific discovers and engineering innovations from bench to bedside.

## PUBLICATIONS

### A. Peer-reviewed Journal Articles (\* indicates authors with equal contributions)

1. **Yuliang Xie\***, Lin Lu\*, Xiao Xiao Tang, Thomas O. Moninger, Tony Jun Huang, David A. Stoltz, Michael J. Welsh, Acidic Submucosal Gland pH and Elevated Protein Concentration Produce Abnormal Cystic Fibrosis Mucus, *Developmental Cell*, *accepted*.
2. **Yuliang Xie**, Zhangming Mao, Hunter Bachman, Peng Li, Peiran Zhang, Liqiang Ren, Mengxi Wu, Tony Jun Huang, Acoustic Cell Separation Based on Density and Mechanical Properties, *Journal of Biomechanical Engineering*, 2020, 142, 031005.
3. **Yuliang Xie**, Hunter Bachman, and Tony Jun Huang, Acoustofluidic methods in cell analysis, *Trends in Analytical Chemistry*, 2019, 117, 280-290.
4. **Yuliang Xie**, Lynda Ostedgaard, Mahmoud H. Abou Alaiwa, Lin Lu, Anthony J. Fischer, and David A. Stoltz, Mucociliary Transport in Healthy and Cystic Fibrosis Pig Airways, *Annals of the American Thoracic Society*, 2018, 15, S171-S176.
5. **Yuliang Xie**, Chenglong Zhao, An optothermally generated surface bubble and its applications, *Nanoscale*, 2017, 9, 6622-6631.
6. **Yuliang Xie**, Nitesh Nama, Peng Li, Zhangming Mao, Po-Hsun Huang, Chenglong Zhao, Francesco Costanzo, and Tony Jun Huang, Probing cell deformability via acoustically actuated bubbles, *Small*, 2016, 12(7), 902-910 (Featured as front cover image of Small, 2016, February).
7. Zhangming Mao, **Yuliang Xie**, Feng Guo, Liqiang Ren, Po-Hsun Huang, Yuchao Chen, Joseph Rufo, Francesco Costanzo, Tony Jun Huang, Experimental and numerical studies on standing surface acoustic wave microfluidics, *Lab on a chip*, 2016, 16, 515-524.
8. Bugra Ayan, Adem Ozcelik, Hunter Bachman, Shi-Yang Tang, **Yuliang Xie**, Mengxi Wu, Peng Li and Tony Jun Huang, Acoustofluidic coating of particles and cells, *Lab on a Chip*, 2016, 16, 4366-4372.
9. **Yuliang Xie**, Chandraprakash Chindam, Nitesh Nama, Shikuan Yang, Mengqian Lu, Yanhui Zhao, John D. Mai, Francesco Costanzo, and Tony Jun Huang, Exploring bubble oscillation and mass transfer enhancements in acoustic-assisted liquid-liquid extraction with a microfluidic device, *Scientific Reports*, 2015, 5, 12572.

10. Po-Hsun Huang, Liqiang Ren, Nitesh Nama, Sixing Li, Peng Li, Xianglan Yao, Rosemarie A. Cuento, Cheng-Hsin Wei, Yuchao Chen, **Yuliang Xie**, Ahmed Ahsan Nawaz, Yael G. Alevy, Michael J. Holtzman, J. Philip McCoy, Stewart J. Levine, and Tony Jun Huang, An acoustofluidic sputum liquefier, *Lab on a Chip*, 2015, 15, 3125-3131.
11. Feng Guo, **Yuliang Xie**, Sixing Li, James Lata, Liqiang Ren, Zhangming Mao, Baiyang Ren, Mengxi Wu, Adem Ozcelik, and Tony Jun Huang, Reusable acoustic tweezers for disposable devices, *Lab on a Chip*, 2015, 15, 4517-4523. (featured as front cover of *Lab on a Chip*, 2015, Issue 15).
12. Zhangming Mao, Feng Guo, **Yuliang Xie**, Yanhui Zhao, Michael Ian Lapsley, Lin Wang, John D. Mai, Francesco Costanzo, Tony Jun Huang, Label-free measurements of reaction kinetics using a droplet-based optofluidic device, *Journal of Laboratory Automation*, 2015, 20(1), 17-24. (Featured as the front cover image of *Journal of Laboratory Automation*, 2015, Issue 1)
13. Po-Hsun Huang, Chung Yu Chan, Peng Li, Nitesh Nama, **Yuliang Xie**, Cheng-Hsin Wei, Yuchao Chen, and Tony Jun Huang, A spatiotemporally controllable chemical gradient generator via acoustically oscillating sharp-edge structures, *Lab on a chip*, 2015, 15, 4166-4176.
14. Chenglong Zhao\*, **Yuliang Xie**\*, Zhangming Mao, Yanhui Zhao, Joseph Rufo, Shikuan Yang, Feng Guo, John D. Mai and Tony Jun Huang, Theory and experiment on particle trapping and manipulation via optothermally generated bubbles, *Lab on a chip*, 2014, 14, 384-391.
15. **Yuliang Xie**\*, Shikuan Yang\*, Zhangming Mao, Peng Li, Chenglong Zhao, Zane Cohick, Po-Hsun Huang, and Tony Jun Huang, In-Situ Fabrication of 3D Ag@ZnO Nanostructures for Microfluidic Surface-Enhanced Raman Scattering Systems, *ACS Nano*, 2014, 8 (12), 12175–12184.
16. Yuchao Chen, Peng Li, Po-Hsun Huang, **Yuliang Xie**, John D. Mai, Lin Wang, Nam-Trung Nguyen and Tony Jun Huang, Rare cell isolation and analysis in microfluidics, *Lab on a Chip*, 2014, 14, 626-645.
17. Adem Ozcelik, Daniel Ahmed, **Yuliang Xie**, Nitesh Nama, Zhiguo Qu, Ahmad Ahsan Nawaz, and Tony Jun Huang, An acoustofluidic micromixer via bubble inception and cavitation from microchannel sidewalls, *Analytical Chemistry*, 2014, 86, 5083-5088.
18. Shikuan Yang, Patrick John Hricko, Po-Hsun Huang, Sixing Li, Yanhui Zhao, **Yuliang Xie**, Feng Guo, Lin Wang and Tony Jun Huang, Superhydrophobic Surface Enhanced Raman Scattering Sensing using Janus Particle Arrays Realized by Site-Specific Electrochemical Growth, *Journal of Materials Chemistry C*, 2014, 2, 542-547.
19. Po-Hsun Huang, Nitesh Nama, Zhangming Mao, Peng Li, Joseph Rufo, Yuchao Chen, **Yuliang Xie**, Cheng-Hsin Wei, Lin Wang and Tony Jun Huang, A reliable, programmable acoustofluidic pump powered by oscillating sharp-edge structures, *Lab on a Chip*, 2014, 14, 4319-4323. (Featured as front cover image of *Lab on a Chip*, 2014, Issue 22)
20. Shikuan Yang, Daniel Slotcavage, John D. Mai, Wansheng Liang, **Yuliang Xie**, Yuchao Chen, and Tony Jun Huang, Combining the Masking and Scaffolding Modalities of Colloidal Crystal Templates: Plasmonic Nanoparticle Arrays with Multiple Periodicities, *Chemistry of Materials*, 2014, 26, 6432–6438.
21. **Yuliang Xie**, Daniel Ahmed, Michael Ian Lapsley, Mengqian Lu, Sixing Li, Tony Jun Huang, Acoustofluidic relay: sequential trapping and transporting of microparticles via acoustically excited

- oscillating bubbles, *Journal of Laboratory Automation*, 2014, 19,137-143.
22. **Yuliang Xie\***, Chenglong Zhao\*, Yanhui Zhao, Sixing Li, Joseph Rufo, Shikuan Yang, Feng Guo and Tony Jun Huang Optoacoustic tweezers: a programmable, localized cell concentrator based on opto-thermally generated, acoustically activated, surface bubbles, *Lab on a Chip*, 2013,13, 1772-1779. (Featured as front cover image of Lab on a Chip, 2013, Issue 14)
  23. Po-Hsun Huang, **Yuliang Xie**, Daniel Ahmed, Joseph Rufo, Nitesh Nama, Yuchao Chen, Chung Yu Chan and Tony Jun Huang, An acoustofluidic micromixer based on oscillating sidewall sharp-edges, *Lab on a Chip*, 2013, 13, 3847-3852.
  24. **Yuliang Xie**, Daniel Ahmed, Michael Ian Lapsley, Sz-Chin Steven Lin, Ahmad Ahsan Nawaz, Lin Wang, and Tony Jun Huang, Single-shot characterization of enzymatic reaction constants  $K_m$  and  $k_{cat}$  by an acoustic-driven, bubble-based fast micromixer, *Analytical Chemistry*, 2012, 84 (17), 7495–7501.
  25. Mingjun Wang, **Yuliang Xie**, Zhengjie Chen, and Shanjing Yao, Optimizing preparation of NaCS-chitosan complex to form a potential material for the colon-specific drug delivery system, *Journal of Applied Polymer Science*, 2010, 117 (5), 3001–3012.
  26. **Yuliang Xie**, Mingjun Wang and Shanjing Yao, Preparation and characterization of biocompatible microcapsules of sodium cellulose sulfate/chitosan by means of layer-by-layer self assembly, *Langmuir*, 2009, 25, 8999-9005.
  27. Mingjun Wang, **Yuliang Xie**, Qiaodong Zheng and Shanjing Yao, A Novel, Potential Microflora-Activated Carrier for a Colon-Specific Drug Delivery System and Its Characteristics, *Industrial & Engineering Chemistry Research*, 2009, 48 (11), 5276-5284.
  28. **Yuliang Xie**, Mingjun Wang and Shanjing Yao, Layer-by-layer self-assembly complex membrane with sodium cellulose sulfate (NaCS)-chitosan, *Journal of Chemical Industry and Engineering (China)*, 2008, 59 (11): 2910-2915.

## B. Peer-reviewed Conference Proceedings

1. **Yuliang Xie**, Lin Lu, and Michael Welsh, *HHMI Science meeting of 2018 at HHMI Headquarters, Chevy Chase, MD*, Formation of defective mucus strands in cystic fibrosis lung disease.
2. **Yuliang Xie**, Shikuan Yang, and Tony Jun Huang, In-situ fabrication of Ag@ZnO nanocomplex in microfluidics to probe surface-enhanced Raman scattering (SERS) fingerprints of single living cells, *MicroTAS 2014 at San Antonio, Texas, USA*.
3. **Yuliang Xie**, Tony Jun Huang, On-chip Fingerprinting Surface Enhanced Raman Scattering (SERS) Spectra of Living Cells Via Ag@ZnO Nanocomplex Fabricated By Optothermal Effect, *Biomedical Engineering Society Conference 2014 at San Antonio, Texas, USA*.
4. Liqiang Ren, Feng Guo, yuchao Chen, Peng Li, **Yuliang Xie**, Tony Huang, A focused surface acoustic wave device for rapid and sensitive detection of *Listeria monocytogenes* based on recombinase polymerase amplification *Biomedical Engineering Society Conference 2014, San Antonio, Texas, USA*.
5. Po-Hsun Huang, Nitesh Nama, Zhangming Mao, Yuchao Chen, **Yuliang Xie**, and Tony Jun Huang, “Tunable microfluidic pump enabled by acoustically oscillated sharp-edges”, *MicroTAS 2014 at San Antonio, Texas, USA*.

6. Po-Hsun Huang, Chung Yu Chan, Nitesh Nama, Yuchao Chen, **Yuliang Xie**, and Tony Jun Huang, "Controllable Generation of Chemical Gradient via Acoustically Oscillated Sharp Edges", *BMES 2014 at San Antonio, Texas, USA*
7. **Yuliang Xie**, Tony Huang, Optoacoustic tweezers: a versatile tool for concentrating, patterning, and manipulating cells/particles, *Biomedical Engineering Society Conference 2013 at Seattle, Washington, USA*.
8. Po-Hsun Huang, Chung Yu Chan, Daniel Ahmed, **Yuliang Xie**, Lin Wang, and Tony Jun Huang, "Tunable microfluidic gradient generator via acoustically oscillated sharp edges", *MicroTAS 2013 at Freiburg, Germany*.
9. Po-Hsun Huang, **Yuliang Xie**, Daniel Ahmed, Nitesh Nama, Yuchao Chen, Chung Yu Chan, Lin Wang, and Tony Jun Huang, "Acoustofluidic micromixer using acoustically oscillated sharp-edges", *MicroTAS 2013 at Freiburg, Germany*.
10. **Yuliang Xie**, Daniel Ahmed, Michael Lapsley, Sz-Chin Lin, Ahmad Nawaz, Tony Huang, Characterization of enzyme reaction constant via acoustic bubble mixer *Biomedical Engineering Society Conference 2012 at Atlanta, Georgia, USA*.
11. **Yuliang Xie**, Tony Jun Huang, Opto/acoustic tweezers: microfluidic particles/cells concentrating and patterning, *Chemical Engineering Research Symposium, 2013, State College, USA*

## RESEARCH HIGHLIGHTS

- The work on "Probing the mechanical properties of cells" was featured as the front cover image of *Small* (2016, February)
- The work on "Reusable acoustic tweezers for disposable devices" was featured as front cover of *Lab on a Chip*, (2015, Volume 15, Number 24).
- The work on "Acoustofluidic sharp-edges sputum liquifier" was featured as the front cover image of *Lab on Chip*. (2015, Volume 15, Number 15)
- The work on "Measurement of reaction kinetics" was featured as the front cover image of *Journal of Laboratory Automation* (2015, Issue 1)
- The work on "Acoustofluidic sharp-edges pump" was featured as the front cover image of *Lab on Chip* (2014, Issue 22)
- The work on "Opto/acoustic tweezers" was featured as the front cover image of *Lab on Chip* (2013, Issue 14)
- The article on "Rare cell isolation and analysis in microfluidics" has been included in *Lab On a Chip 2014 Most Accessed Articles* collection.
- The work on "Acoustofluidic sharp-edges micromixer" has been selected as a *Lab on a Chip HOT Article*.
- The work on "Acoustofluidic pump" has been selected as a *Lab on a Chip HOT Article 2014*.
- The article on "Rare cell isolation and analysis in microfluidics" is the most downloaded article from *Lab on a Chip* during January - April 2014.
- The work on "Reusable acoustic tweezers for disposable devices" has been highlighted as a News Report by *Scienceworldreport, PDIINET, Science Daily, Our Ladies and Gentlemen, Clever*

*Mind, Jersey Tribune, science Free-Tuition, Newsoneplace, Crazychucks, On Line News Planet, Sci24h, Startupz.info, En.haberler, Punjabtribune, GPL, Infection Control & Clinical Quality, Em2stem, Environment, Bioportfolio, Debtfree, EFLMagazine, Ahmad-sans, Scienceworldreport, Delmar integrative medicine, Sciencenewslite, Opennano, Dailysabah, NSF, Penn State.*

- The work on "Acoustofluidic pump" has been highlighted as a News Report by *The Analytical Scientist; National Science Foundation; Science Daily; Phys.Org; Penn State MRI News; Penn State Engineering News; BioPortfolio; Azonano.com; Newswise; Daily News; Polymer Solutions.*
- The work on "An acoustofluidic human-sputum liquefier" has been featured as a top story on *NSF's Science 360 Newswire Science360.*
- The work on "An acoustofluidic human-sputum liquefier" has been highlighted as a News Report by *NSF; BioSpectrum; Science and Technology Research News; MedicalXpress; Controlled Environments; NewsWise; Bioon (China); Lung Disease News; Infection Control Today (UK); Buffalo Breeze (Australia); FreshGhana (Ghana); MedIndia (India); BusinessLine (India); The Financial Express (India); NDTV (India); AZO NANO (UK); The Times of India; ScienceDaily; medGadget; PSU.*

## INVITED TALKS

02/2020	Roy J. Carver Department of Biomedical Engineering, University of Iowa, IA, USA.
01/2020	Department of Physiology and Pharmacology, West Virginia University, WV, USA.
05/2019	College of Chemical and Biological Engineering, Zhejiang University, Hangzhou, China.
10/2017	University of Iowa Microfabrication Facility, University of Iowa, IA, USA.

## SERVICES ACTIVITIES

- Independent reviewer for scientific journals: *Fluidics, Sensors, Micromachines, Journal of Materials Chemistry B, Lab on a chip, Scientific Reports, Chemical Communications, Soft Matter.*
- Referee panel for scientific conferences: *2014 MRS spring meeting & exhibit, IEEE Sensors 2015, IEEE Sensors 2016, IEEE Sensors 2017, IEEE Sensors 2018.*