

HSUEH–CHIA CHANG

Bayer Professor of Chemical Engineering
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Education

BS	California Institute of Technology	June 1976
PhD	Princeton University	June 1980

Professional Appointments

Chair of Scientific Advisory Board, Intercellular Inc	2025-Present
Yushan Fellow, National Yang Ming Chiao Tung University, Taiwan	2025-2028
Chief Technology Officer and Board member, Aopia Biosciences	2019 – Present
Fellow, Notre Dame Institute for Asia and Asian Studies	2013 – Present
Distinguished Visiting Professor, UK Royal Society of Engineering, Imperial College	2011
Chief Scientific Advisor, FCubed, LLC	2010 – 2014
Founding and Chief Editor, Biomicrofluidics American Institute of Physics	2006 – 2018
Bayer Professor of Chemical Engineering, Notre Dame	1998 – Present
Senior Visitor, Department of Applied Mathematics and Theoretical Physics University of Cambridge	1993 – 1993
Chairman, Dept. of Chemical Engineering, Notre Dame	1989 – 1995
Professor, University of Notre Dame	1987 – 1998
Associate Professor, University of Houston	1984 – 1987
Associate Professor, University of California, Santa Barbara	1983 – 1984
Assistant Professor, University of California, Santa Barbara	1980 – 1983

Awards and Honors

- > Regent's Junior Faculty Award, University of California, Santa Barbara, 1980
- > Presidential Young Investigator Award, National Science Foundation, 1985
- > Colburn Lecture, University of Delaware, 1988
- > Sigma Xi Outstanding Research Award, University of Notre Dame, 1990
- > Francois N. Frenkiel Award, Fluid Dynamics Division, American Physical Society, 1991
- > Fellow of the American Physical Society, 1997.
- > Stanley Corrsin Hydrodynamic Lecture, Johns Hopkins, 2002.
- > Founding and Chief Editor, Biomicrofluidics, American Institute of Physics, 2007-18
- > Distinguished Visiting Fellow Award, Royal Society of Engineering, UK, 2011
- > Indiana 1st Source Commercialization Award, Notre Dame, 2013
- > Distinguished Lecture, Mechanical Engineering, Boston University, 2018.
- > Special Festschrift Issue in Biomicrofluidics, Volume 13(6), 2019.
- > Lifetime Achievement Award, American Electrophoresis Society, 2019
- > Fellow, National Academy of Inventors, 2020.
- > Provost Research Achievement Award, Notre Dame, 2024.
- > Notre Dame All-Star Faculty Team, honored at Stanford game, Oct 12, 2024.
- > Fellow, American Institute of Medical and Biological Engineering, 2025.
- > Yushan Fellow, Ministry of Education, Taiwan, 2025.
- > 22nd National Innovation Award, Ministry of Economic Affairs, Taiwan, 2025.

Named Lectures

- Colburn Lecture, University of Delaware, 1988
- Stanley Corrsin Hydrodynamics Lecture, Johns Hopkins 2002
- Distinguished Lecture, Mechanical Engineering, Boston University, 2018

Plenary and Keynote Lectureships

- Invited General Lecture at International Union of Theoretical and Applied Mechanics Symposium on Nonlinear Instability of Nonparallel Flows, Potsdam, 1993
- Invited General Lecture at International Union of Theoretical and Applied Mechanics Symposium on Structure and Dynamics of Nonlinear Waves in Liquids, Hannover, Germany, 1994.
- Invited General Lecture at International Union of Theoretical and Applied Mechanics.
- Nonlinear Singularities in Deformation and Flow (Haifa, 1997).
- Keynote Lecture, Second Joint US/China Chemical Engineering Conference, Beijing, May 1997.
- Keynote Lecture, 13th International Congress of Chemical and Process Engineering, CHISA'98, Prague, August 1998.
- Keynote Speaker, ASME International Conference on Micro-channels and Mini-channels, Rochester, June 2004; Pohang, June 2009.
- Keynote Speaker, Biomedical Engineering Society 2004 Annual Symposium, Tainan, Taiwan, December 2004.
- Keynote Speaker, Indiana Biosensor Symposium, Indianapolis, April 2005.
- Keynote Lecturer, The Bianchi Session on Thin Films of Soft Matter, International Center for Mechanical Sciences, Udine, Italy, July 2005.
- Keynote Lecturer, Annual Conference of the Society of the Korean Analytical Science and Technology, Mokpo, Korea, May 2006.
- Keynote Lecture, Advances in Microfluidics and Nanofluidics, Hong Kong, 2009; Singapore, 2011; Dalian, 2012; Notre Dame, 2013; Taipei, 2014; Beijing, 2015.
- Keynote Lecturer, ACS Colloid and Interfacial Science Symposium, Columbia University, June 2009.
- Keynote Lecture, ASME Mini/Micro/Nano Channels Conference, Pohang, Korea, June 2009.
- Keynote Lecture, Asian-Pacific LabChip Conference, Shanghai, October 2009.
- Invited Speaker, Workshop on Electrokinetics, IMA, University of Minnesota, December 2009.

- Keynote Lecturer, Second ASME Micro/Nanoscale Heat/Mass Transfer International Conference, Jiaotong University, Shanghai, December 2009.
- **Plenary Lecture**, Wave Phenomena IV, Edmonton, Canada, June 2010.
- Invited Lecture, Phoresis Workshop, Pohang, Korea, September 2010.
- Plenary Speaker, China-Japan-Korea Symposium on Analytical Chemistry, Wuhan 2010.
- **Plenary Speaker**, Electrokinetics Workshop, Haifa, Israel, December 2010.
- Keynote Speaker, AMN-APLOC, Singapore, January 2011.
- **Plenary Speaker**, Electrokinetics Workshop, Imperial College, London, 2011.
- Invited Speaker, Electrokinetics Symposium, APS-DFD Annual Meeting, Baltimore, November 2011.
- Keynote Speaker, International Conference of Applied Science, Opening of Applied Science Division Building, Academia Sinica, Taiwan, October 2013.
- Keynote Speaker, Foundations of NanoScience, Snowbird, Utah, April, 2014.
- Invited Lecturer, Dielectrophoresis 2014, London, July 2014.
- Keynote Speaker, China-German Optical Medical Devices Conference, Suzhou, Sept 18-19, 2014.
- Keynote Speaker, Taiwan Institute of Chemical Engineers Annual Meeting, Taoyuan, Taiwan, Dec 13, 2014.
- **Plenary Speaker**, 7th WACBE World Congress on Bioengineering, Singapore, July 6, 2015.
- Keynote and Plenary Lectures: SelectBIO Microfluidics Congress San Diego, September 2015, 2016, 2017, 2018, 2019; March, Boston, 2017
- Keynote Lecture, Bionics Center PhD Congress, Budapest, Hungary, November 2016.
- **Plenary Lecture**, Advances in Pharmaceutical Advances, Wuhan, November 17, 2019.
- Chemical Engineers in Medicine **Plenary Lecture**, AIChE Annual Meeting, 2019.
- **Plenary Speaker**, International Conference on Smart Sensors 2022, Taiwan, 2022.
- Keynote Speaker, SelectBIO Circulating Biomarker and Extracellular Vesicles Europe, Rotterdam, June 2023.
- Keynote Speaker, ACS Colloid and Surface Science Symposium, Seattle, June 2024.
- Keynote Speaker, SelectBIO Extracellular Vesicles and Lipid Nanoparticles 2025: Diagnostics, Therapeutics and Delivery, Miami, May 2025.
- **Plenary Speaker and Chair**, SelectBIO Extracellular Vesicle Asia, Shenzhen, January 2026.

Outreach/Service Overview

Tech Transfer and Consulting Accomplishments

- > Technologies licensed to Cubed Laboratories (cubedlabs.com) for food safety, AgenDx Biosciences (www.agendxbio.com) for cancer screening, ImpDx (www.impedx.com) for Sepsis Screening. Scientific Methods (www.scientificmethods.com) for water filtration and Aopia Biosciences for extracellular vesicle (exosome) purification and diagnostics.
 - > **Chief Scientific Advisor** for FCubed 2010-2014.
 - > Expert witness for 10x Genomics in litigation with BioRad 2018.
 - > Developing a GMO food screening platform with the Far Eastern Group 2018-Present.
 - > Won the Notre Dame **1st Source Commercialization Award** for my tech transfer efforts.
 - > **Co-founder** of **Aopia Biosciences**, which licensed 4 ND IPs from the Chang lab.
 - > **Chief Technology Officer** and board member, **Aopia Biosciences**, 2019-present.
- Raised funds and developed prototypes for a purification product for extracellular vesicles in anticipation of a large liquid biopsy and drug delivery market. First commercial product NanoEx entered the market in 2025.

Editorial Accomplishments

- > **Founding and Chief Editor** of *Biomicrofluidics* journal of the American Institute of Physics (2006-2018). First AIP journal in medical/biological fields and first to be electronic only. Highest ranked journal in the ISI Fluids and Plasma Physics category. Founded and raised funds for an affiliated conference Advances in Microfluidics and Nanofluidics held at Hong Kong, Singapore, Dalian, Notre Dame, Taipei, Beijing, Singapore and Hobart.
- > Editorial board: *Membrane*, 2011-Present
- > **Associate Editor**: *SIAM Journal of Applied Math*, 2000 – 2009

- > Advisory Board of *Acta Mechanica*, 2003-2005
- > *International J of Bifurcation & Chaos in Applied Sciences and Engineering*, 1990 -95.

Administrative and University Service Accomplishments

- > **Department Chair** of Chemical and Biomolecular Engineering (1989-1995)
Hired five faculty members, including the first woman to the Engineering College (Brennecke, now member of NAE). Research expenditure doubled during chairmanship.
- > Mentored six junior faculty at Notre Dame: Ed Maginn, Elaine Zhu, David Go, Arezoo Ardekani, Donny Hanjaya-Putra, Yichun Wang. Five won NSF Career Awards and three are women.
- > Founding Director of Center for Microfluidics and Medical Diagnostics (CMMD, 2003-2020). The Center initiated Tech Transfer at Notre Dame. **18 patents from the Center.**
- > Founding executive committee of Advanced Diagnostics and Therapeutics Initiative.
- > Advisory Committee to VP of Research Notre Dame 2016-18.
- > Advisor, Foundation for International Medical Relief of Children (>**100 members**) 2013-Present

Professional Activities and Services

- o Organized the International Union of Theoretical and Applied Mechanics for Symposium on Nonlinear Wave Behavior in Multi-Phase Flow, July 1999, Notre Dame.
- o AIChE Chair of Area 10d (Applied Mathematics) 1994-1996.
- o Panelist, NSF/EPA Partnership for Environmental Research, 1995; NSF (CTS) 2001; 2005.
- o **Advisory Council**, Chemical Engineering Department, Princeton University, 1996 – 2000.
- o Scientific Committee for International Union of Theoretical and Applied Mechanics for Symposium on Nonlinear Singularities in Deformation and Flow, March, 1997 at Haifa, Israel.
- o Scientific Advisory Committee of CHISA Congress on Nonlinear Dynamics in Chemical and Bioengineering Processes, Prague, August 1998.
- o Technical advisor to the Mathematics Department, Institute of Technology at Bandung, Indonesia, 1997-98.
- o Organizing Committee, Annual Meeting of American Physical Society-Division of Fluid Dynamics, New Orleans, 1999.
- o Steering Committee, Indiana Biosensor Symposium, 2005.
- o Steering Committee (founding member): Center for Advanced Diagnostics and Therapeutics, University of Notre Dame.
- o **Appointed Scientific Advisor of F Cubed, LLC** (2008).
- o Organized and raised funds (US\$60K) Advances in Microfluidics and Nanofluidics, Hong Kong, January 2009.
- o Raised funds (US\$40K) and organized Advances in Microfluidics and Nanofluidics 2013, Notre Dame.
- o Advisory Committee, Second ASME Micro/Nanoscale Heat/Mass Transfer International Conference, Jiaotong University, Shanghai, December 2009
- o Advisory Committee, Chemical Engineering, National Taiwan University 2012.
- o Founded the AIP Biosciences Horizons lecture series at Notre Dame 2018.
- o **Expert witness:** Irell-Manela BioRad vs 10xGenomics, 2017-2018. Landmark litigation on droplet PCR.
- o **Review Committee**, Okinawa Institute of Science and Technology, July 2018.
- o **Cofounder of Aopia Biosciences**, appointed **Acting Chief Technology Officer and Board member**.
- o Review over 20 papers a year for LabChip, BMF, Scientific Report, PRL, PRE, NanoLetters, Biosensors & Bioelectronics, ACS Nano, Anal Chem, Adv Sci, Sci Adv etc.
- o Served on review panels at NIH (two per year), NSF, Hong Kong Research Council (Collaborative Research Fund panel 2023-2026).
- o **Appointed Chair of Scientific Advisory Board of Intercellular, Inc.** (2025)

Research Overview

Research Achievements in Chronological Order:

1. 1977-89 Advanced understanding of chaotic dynamics of **catalytic converters** reactors.
2. 1987-90 Explained the effect of surfactants on bubble transport in microchannels and analyzed droplet transport in anticipation of **droplet microfluidics**.
3. 1989-08 Developed a theory for **wetting dynamics** far from equilibrium and explained stick-slip ring-formation dynamics during evaporation and patterning.
4. 1994-99 Developed a theory for **rapid ignition of automobile catalytic converters**. Invented a by-pass design to achieve rapid ignition.
5. 1994-04 Delineated **wave evolution on a falling film** and other interfacial patterns by developing a spectral theory for solitary wave interaction.
6. 2004-11 Invented DC **electro-osmotic pumps/sprays** and AC **dielectrophoretic cell sorting** technologies.
7. 2005-Present Discovered **AC Nanocone** and invented **AC Electrospraying, Electrospinning** and Surface Acoustic Wave Nanodrop Generation for mass spectrometry, exosome lysing and droplet digital PCR.
8. 2005-Present Analyzed **non-equilibrium induced dipoles near geometric singularities**, which inspired inventions in **cone plasmonics, nanopores with edge pinning** to delay molecular translocation and **superparamagnetic wedge traps** for nano-magnetic beads.
9. 2008-2016 Verified the mechanism for **over-limiting ion current in ion-selective membranes** and applied it to molecular/vesicle concentration, precipitation, fractionation and sensing.
10. 2009 and 2018 Invented a **Carbon Nanotube dielectrophoretic assembly and alignment** technology for biosensing and FET circuits.
11. 2011 Invented a **bipolar membrane** for **water splitting**, pH actuation and a continuous isoelectric fractionation nanocarrier/molecular fractionation device.
12. 2012 Invented a **membrane sensor** for charged molecules by utilizing the ion depletion feature of a permselective membrane to enhance their gating effect on the overlimiting electroconvective instability.
13. 2015 Invented a surface-modified **solid-state nanopore sensing technology** that controls molecular translocation by its flexibility through edge pinning.
14. 2016 Invented an **AC droplet** generation technology for **digital PCR**, single-cell assay and conformal cell encapsulation.
15. 2018 Invented an **asymmetric nanopore membrane (ANM)** technologies for high-throughput/yield for nanocarrier (**extracellular vesicles**) **fractionation** by size and purification.
16. 2019 Extended the **membrane sensors to proteins** by using a silica particle reporter to gate the ion current.
17. 2020 Extended the asymmetric nanopore membrane for **isolation of virus** for COVID and other virus detection.
18. 2020 Invented a **nanoporous magnetic membrane (MNM)** superparamagnetic trap with sharp wedges for high-sensitivity and high-throughput **nano magnetic bead immunoassay**.
19. 2020 Invented an **elliptical pipette droplet generation** technology for portable digital PCR.
20. 2020 Invented an **extracellular vesicle lateral flow assay** by ion depletion-enhanced nanocolloid precipitation.
21. 2022 Extended the membrane sensor to **profile proteins on extracellular vesicles** (lipoproteins, exosomes and supermeres).
22. 2023 Invented **Janus particle extracellular vesicle diagnostics** for disease screening with blood samples.
23. 2023 Developed a new **activity assay for enzymes on extracellular vesicles** and antioxidants on HDL.
24. 2024 Developed the first **diagnostic platform for supermeres**, a new biomarker nanocarrier.
25. 2025 Developed a **Field-Effect Transistor multimodal extracellular vesicle platform** that can assay colocated proteins and miRNAs of single EV for precision liquid biopsy.
26. 2004-Present More than 30 IP disclosures—highest in Notre Dame history. 21 have been patented and 7 more pending. 8 IPs licensed and 10 optioned by startups.

Personal Statement on Recent Research/Professional Activity and Vision

I was born to a diaspora Chinese family and grew up in Taiwan, Singapore, Malaysia and California. My early career included two moves to be with my mathematician wife and a stint as the Department Chair (at 35). My original research was on the mathematical theories of non-equilibrium reaction dynamics/pattern formation and interfacial fluid dynamics. Building on my knowledge in transport and multi-scale analyses, I reoriented my research in 2000 towards the development of microfluidics and diagnostic technologies based on non-equilibrium electrokinetics. With the myriad of disease biomarkers discovered by 'omics research, I anticipated that health care is at the precipice of a paradigm change. The bottleneck was and still is a key missing technology--a low cost and high-throughput multiplex diagnostic platform sufficiently sensitive and selective for assaying **untreated physiological fluids** without interference issues. This obstacle is exacerbated by recent discovery that many biomarkers are carried by nanocarriers like **extracellular vesicles (EV or exosomes) and nanoparticles** which are very low in abundance (fM) and mobility. I invented electrokinetic charge and size based sensing platforms to overcome this key obstacle by suppressing interference from non-target proteins. The charge and size signal from the EV is amplified with electroconvective instability and Brownian rotation, respectively. To further enhance reproducibility, I use ion depletion features of ion-selective membranes to control the local ionic strength and pH. I also use microsensors to achieve rapid EV capture from a fixed volume that is insensitive to sample volume and handling. Properly integrated, these new designs significantly reduce the scatter in conventional assays due to false positives/negatives. As they do not need expensive optics, my new platforms also enable low-cost and large-scale manufacturing, an important requisite for the next generation of medical diagnostics. Working with several leading medical schools, we are testing my new diagnostic technologies with clinical samples. Before approval for the clinical market, they are commercialized as agricultural and research assays, such as CRDTM Botrytis Detection kit by CubedLabs and NanoExTM for large-scale EV purification by Aopia Bio. I co-founded Aopia Bio in 2019 and currently serve as its CTO and Board member. In 2025, I joined Intercellular Inc, a major startup with 3 CEOs of midsize publicly traded biotech companies, that has acquired 10 of our nanocarrier diagnostics IPs. Intercellular intends to develop a commercial screening platform for high-value personalized biomarker data that can enable AI-assisted personalized healthcare. I serve as the Chair of Intercellular's scientific board.

More than 35 of my PhD and post-doc students (out of ~80) have embarked on microfluidics academic careers as tenure-track professors in all engineering and science disciplines over 5 continents (15 in the US), including Duke, Imperial, Johns Hopkins etc. They include the chancellor at Federal University, Nigeria (Mobolaji Aluko), the Provost at Iowa State (Jason Keith), Department Chairs at Michigan Tech (Adrienne Minerick), Mississippi State (Keith) and Howard University (Aluko). Three (Minerick, Zilin Chen and Leslie Yeo) hold endowed chairs. Three (Keith, Minerick and Chen) were deans. Five were NSF Career Awardees, including three women. My first PhD, Mobolaji Aluko, is an African American. The industrial alumni of my lab hold leadership positions at Genentech, Merck, Gilead, Alcon, Intel, Google, Chevron etc.

I founded a new journal, Biomicrofluidics of the American Institute of Physics, in 2006 to serve the microfluidics community in Engineering. Biomicrofluidics is the first AIP title in the bio area (and the first to offer open-access). I wrote the definitive book in the field, Electrokinetically Driven Microfluidics and Nanofluidics by Cambridge University Press in 2009, which remains the most authoritative text in Electrokinetics. As department chair, I hired the first woman Engineering faculty (now member of NAE) to Notre Dame. I have since collaborated with and mentored many Notre Dame women faculty. I have also worked with several African American and hispanic collaborators and students, such as Mobolaji Aluko (Howard University), Andre Palmer (Ohio State), Reggie Hill (USC), Sebastian Sensale (IU Indianapolis) etc.

Patents (9 Pending)

1. Process and Apparatus for Enhancing In-Tube Heat Transfer by Chaotic Mixing (with Mihir Sen), US Patent US5, 311, 932 (1994).
2. Method and Apparatus for treating exhaust gas (with David Leighton), United States Letters Patent US6,428,754 (2002).
3. Microfluidic Mixer (with Shau-Chun Wang, Hsiao-Ping Chen and Chia-Yu Lee), Taiwan patent TW1322032B (2008).
4. Method and Apparatus for Rapid Particle Manipulation and Characterization (with Zachary Gagnon) US Patent US7,744,738. (2010).
5. Methods and Apparatus to Capture and Release Microbe Particles Using Amine functionalized Silica (with Zilin Chen). [Licensed to Scientific Methods Inc.](#)
6. Methods and apparatus for AC Electrospray (with Leslie Yeo, Shau-Chun Wang, Zach Gagnon and Dmitry Lastochkin) US Patent US8,267,914 (2012). [Licensed to Aopia Biosciences.](#)
7. Rapid Detection of Viable Bacteria System and Method (with Shramik Sengupta and Sachidevi Puttaswamy. [Licensed to ImpeDx.](#)
8. Microfluidic Platforms for Multi-Target Detection (with Jason Gordon, S. Senapati, Zach Gagnon and Sagnik Basuray. US Patent US8771938 (2014), CA2702276C [Licensed to F Cubed, LLC](#), now CubedLaboratories.
9. Methods and apparatus for mass spectrometry utilizing an AC electrospray device (with David Go, Nishant Chetwani, Catherine Cassou) US Patent US8,716, 675 (2014). [Licensed to Aopia Biosciences.](#)
10. Microchamber Electrochemical Cell having a Nanoslot (with G. Yossifon, S. Basuray) US Patent 8,969,007 (2010).
11. Method and Apparatus for a nanopipette Biosensor (with Shoupeng Liu, S Senapati, Yunshan Wang and Yu Yan) US patent US9856518 (2014).
12. Methods and Apparatus for nanomembrane-based nucleic acid sensing for portable diagnostics. (with Zdenek Slouka, S. Senapati and Li-Jing Cheng, [Licensed to AgenDx LLC](#), [Optioned to Intercellular](#), US Patent US10,557,820 P01010 (2016).
13. Integrated Membrane Sensor for Rapid Molecular Detection (with Zdenek Slouka, S. Senapati and Sunny Shah, [Licensed to AgenDx LLC](#), [Optioned to Intercellular](#) US Patent US10,247,720 (2019) P01116 (2015), US11016079 (2021).
14. Ultra-Sensitive Multi-Target Lateral Flow Molecular Assay with Field-Induced Precipitation (with Steve Marczak, Zdenek Slouka and S. Senapati) US Patent US10669572.
15. Methods and Apparatus for a Shear-Enhanced CNT-Assembly NanoSensor Platform for Ultra-Sensitive and Selective Protein Detection (with Diya Li, Gongchen Sun, Ceming Wang and S. Senapati) US Patent US 10,955,380
16. Simultaneous Isolation and Preconcentration of Exosomes by Ion Concentration Polarization Method and Apparatus (with Steve Marczak, Zeinab Ramshani, David Go, Reginald Hill and S. Senapati). US Patent US 10983085. [Licensed to Aopia Biosciences.](#)
17. A Solid-State Nanopore miRNA Quantification Technology (with Ceming Wang and S. Senapati) US Patent US 11,162,935.
18. AC Electrosprayed droplets for Digital and Emulsion PCR (with D. Go, S. Senapati, Yongfan Men and Zehao Pan) US Patent US 11,293,057. [Licensed to Aopia Biosciences.](#)
19. Size-Based Asymmetric Nanopore Membrane (ANM) Filtration for High-Efficiency Exosome Isolation, Concentration and Fractionation. (With Ceming Wang) Japanese patent: JP7660916B. [Licensed to Aopia Biosciences.](#)
20. Method of Encapsulating Single Cells Utilizing an Alternating Current. (With Donny HanjayaPutra, Zehao Pan, Loan Bui and Vivek Yadav). US Patent US 12,464,674.
21. Scalable High-Throughput Isoelectric Fractionation Platform for Extracellular Nanocarriers (with Satyajyoti Senapati, Himani Sharma, David Go). Patent Application: 18/173,248. Allowance notified 10/07/2025.

Publications (Over 300 Refereed Journal Papers)

(H factor: 79, > 20,000 total citations, [Google Scholar](#))

Books:

“IUTAM Symposium on Nonlinear Waves in Multi-Phase Flow”, Kluwer Academic Press, 2000.

“Complex Wave Dynamics on Thin Films” (with Evgeny A. Demekhin), Elsevier Scientific Press, 2002.

“Electrokinetically Driven Microfluidics and Nanofluidics” (with Leslie Yeo), Cambridge Univ Press, 2009.

Journal Papers:

Fluid Mechanics Theory: Phys Fluid (20 papers), PRE(16), Phys Rev Letter (15), JFM (13), JColloidInterfSci (6), SIAM J App Math (3), Phil Trans Royal Soc (2), Annual Review of Fluid Mech (2)

Micro-Nanofluidics: Biomicrofluidics (25), Lab Chip (12), JCP(12), Electrophoresis (12), Biosensors & Bioelectronics (8), ACSNano (4), Analytical Chemistry (4), JPC(3), Small (3), Comm Bio (3), ACS Appl Materials & Interface (2), Nature Comm (2), Annual Review of Analytical Chem (1), Adv Materials (1), Nanoscale (1), Nature Biomedical Eng(1)

Reaction Engineering/Control : Chem Eng Sci (25), AIChE J (9), Chem Eng J (2)

Last author is the corresponding author unless marked by * Blue font face: [Over 100 citations](#)

1. Oka, M., Chang, H.-C. and Gavalas, G. R., "Computer-Assisted Molecular Structure Construction for Coal-Derived Compounds," Fuel, 56 1 (1977).
2. Chang, H.-C. and Weinberg, W. H., "Modulated Molecular Beam Mass Spectrometry: A Generalized Expression for the 'Reaction Product Vector' for Linear Systems," J. Chem. Phys., 66, No. 9, 4176 (1977).
3. Chang, H.-C. and Weinberg, W. H., "An Analysis of Modulated Molecular Beam Mass Spectrometry Applied to Coupled Diffusion and Chemical Reaction," Surface Science, 65, 153 (1977).
4. Chang, H.-C. and Weinberg, W. H., "An Analysis of Modulated Molecular Beam Mass Spectrometry Applied to Nonlinear System," Surface Science, 72, 617 (1978).
5. Chang, H.-C. and Weinberg, W. H., "Modulated Molecular Beam Scattering from Solid Surfaces: the Pulse Testing Method of Analysis," Application of Surface Science, 3, 168 (1979).
6. Chang, H.-C. and Calo, J. M., "Exact Criteria for Uniqueness and Multiplicity via a Catastrophe Theory Approach," Chem. Eng. Sci., 34, 285 (1979).
7. Chang, H.-C. and Calo, J. M., "A Priori Estimation of Chemical Relaxation Oscillations Via a Singular Perturbation Technique," Chem. Eng. Commun., 3, 431 (1979).
8. Chang, H.-C. and Calo, J. M., "Regions of Multiplicity for Various Models of Chemical Reactors," Chem. Eng. Sci., 35, 264 (1980).
9. Chang, H.-C. and Calo, J. M., "Exact Universal Criteria for the Adiabatic Tubular Packed Bed Reactor," Chem. Eng. Sci., 35, 1611 (1980).
10. Chang, H.-C. and Aluko, M., "A Quasi-Steady State Analysis of the Dynamics of Two-Species Heterogeneous Catalytic Reactions," Chem. Eng. Sci., 36, 1611 (1981).
11. Chang, H.-C. and Calo, J. M., "Analysis of Radial Flow Packed Bed Reactors--How Are They Different?" in "Chemical Reactors", H. S. Fogler, ed., ACS Symposium Series, 168 (1981).
12. Chang, H.-C. "A Non-Fickian Model of Packed Bed Reactors," AIChE J., 28, 208 (1982).
13. Aluko, M., and Chang, H.-C., "Multiplicity, Uniqueness and Stability for an Exothermic Reaction in a Non-Adiabatic Bubble Column Reactor," Chem. Eng. J., 24, No. 2, 151 (1982).
14. Chang, H.-C.*, and Aluko, M., "Comment on the Model for Isothermal Oscillations of Ethylene Oxidation on Platinum," J. of Catal., 73, 198 (1982).
15. Chang, H.-C.*, "Multi-Scale Analysis of Effective Transport in Periodic Heterogeneous Media," Chem. Eng. Commun., 15, 83 (1982).

16. Chang, H.-C.*, Saucier, M. and Calo, J. M., "A Design Criterion for Radial Flow Fixed Bed Reactors," *AIChE J.*, 29, 1039 (1983).
17. Chang, H.-C., "The Domain Model for Heterogeneous Catalysis," *Chem. Eng. Sci.*, 38, 535 (1983).
18. Chang, H.-C., "Effective Diffusion and Conduction in Two-Phase Media - A Unified Approach," *AIChE J.*, 29, 846 (1983).
19. Benzoni, J., and Chang, H.-C., "Effective Diffusion in Bidisperse Media - An Effective Medium Approach," *Chem. Eng. Sci.*, 39, 161 (1984).
20. Chang, H.-C.*, and Aluko, M., "Multi-Scale Analysis of Exotic Dynamics in Surface Catalyzed Reactions - I. Justification and Preliminary Model Discrimination," *Chem. Eng. Sci.*, 39, 37 (1984).
21. Aluko, M., and Chang, H.-C., "Multi-Scale Analysis of Exotic Dynamics in Surface Catalyzed Reactions - II. Quantitative Parameter Space Analysis of an Extended Langmuir-Hinshelwood Reaction Scheme," *Chem. Eng. Sci.*, 39, 51 (1984).
22. Chen, L.-H., and Chang, H.-C., "Global Stabilization of a Biological Reactor by Linear Feedback Control," *Chem. Eng. Comm.*, 27, 231 (1984).
23. Chang, H.-C.* and Chen, L.-H., "Bifurcation Characteristics of Nonlinear Systems Under Conventional PID Control," *Chem. Eng. Sci.*, 39, 1127 (1984).
24. Aluko, M., and Chang, H.-C., "PEFLOQ: An Algorithm for the Bifurcational Analysis of Periodic Solutions of Autonomous Systems," *Comp. and Chem. Eng.*, 8, 355 (1984).
25. Chang, H.-C., "Several paths to Chaos in a Stiff CO Oxidation System" in "Frontiers in Chemical Reaction Engineering", L. K. Doraiswamy and R. A. Mashelkar, eds., Wiley Eastern Ltd. (1984).
26. McDermott, P., Bonvin, D., Mellichamp, D. and Chang, H.-C., "Eigenvalue Spectra and Modal Contributions for Counterflow Reactor Models," *Chem. Eng. Comm.*, 31, 263 (1984).
27. McDermott, P., and Chang, H.-C., "On the Global Behavior of an Auto-Thermal Reactor Stabilized by Linear Feedback Control," *Chem. Eng. Sci.*, 39, 1347 (1984).
28. Lahbabi, M. and Chang, H.-C., "High Reynolds Number flow Through Cubic Arrays of Spheres--Steady-State Solution and Transition to Turbulence," *Chem. Eng. Sci.*, 40, 435 (1985).
29. McDermott, P. E., Chang, H.-C. and Rinker, R. G., "Experimental Investigation of Controller-Induced Bifurcations in a Tubular Reactor," *Chem. Eng. Sci.*, 40, 1355 (1985).
30. Chen, L.-H. and Chang, H.-C., "Nonlinear Stability of a Bubble Column Reactor," *Chem. Eng. J.*, 3D(2), 103 (1985).
31. Chen, L.-H. and Chang, H.-C., "Global Effects of Controller Saturation on Closed-Loop Dynamics," *Chem. Eng. Sci.*, 40, 2191 (1985).
32. Aluko, M. and Chang, H.-C., "The Stability and Oscillations of Carbon Monoxide Oxidation over Platinum Supported Catalyst: Effect of Butene," *Chem. Eng. Sci.*, 40, 2389 (1985).
33. Aluko, M., and Chang, H.-C., "Dynamic Modelling of a Heterogeneously - Catalyzed system with Stiff Hopf Bifurcation," *Chem. Eng. Sci.*, 41, 317 (1986).
34. Chang, H.-C., "Recent Developments in the Dynamics of Heterogeneous Catalytic Reactions," chapter in "Dynamics of Nonlinear Systems," Editor V. Hlavacek, Gordon and Breach Concepts in Chemical Engineering Series, (invited review) Chap. 3, 85 (1986).
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300. Zhang#, C., Huo#, X., Zhu, Y., Higginbotham, J. N., Cao Z., Lu, X., Franklin, J. L., Vickers, K. C., Coffey, R. J., Senapati, S., Wang, C.* and Chang, H.-C.*, "Electrodeposited Magnetic Nanoporous Membrane for High-Yield and High-Throughput Immunocapture of Extracellular Vesicles and Lipoproteins", *Comm Bio*, 5:1358 (2022).
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302. Chen, L., Zhang, C., Yadav, V., Wong, A., Senapati, S. and Chang, H.-C., "A Home-Made Pipette Droplet Microfluidics Rapid Prototyping and Training Kit for digital PCR, microorganism/cell encapsulation and controlled microgel synthesis", *Scientific Rep*, 13:184(2023). (**Top 20** downloaded Scientific Report articles in Engineering in 2023 out of 2073 articles).
303. Kumar, S., Maniya, N., Wang, C., Senapati, S.* and Chang, H.-C.*, "Quantifying PON1 on HDL with Nanoparticle-Gated Electrokinetic Membrane Sensor for accurate cardiovascular risk assessment", *Nature Comm*, 14:557(2023).

304. Sharma, H., Yadav, V., D'Souza-Schorey, C., Go, D, Senapati, S.* and Chang, H.-C.*, "A Scalable High-Throughput Isoelectric Fractionation Platform for extracellular nanocarriers: comprehensive and bias-free isolation of ribonucleoproteins from plasma, urine, and saliva", *ACS Nano*, 17 (10): 9388-9404(2023).
305. Zhang, Y., Kim, G., Zhu, Y., Wang, C., Zhu, R., Lu, X., Chang, H.-C.* and Wang, Y.*, "Chiral Graphene Quantum Dot enhanced drug loading into small extracellular vesicles", *ACS Nano*, 17(11):10191-10205(2023).
306. Jeong, D. P., Pinzon, D. M., Chang, H.-C., Hanjaya-Putra, D., "Fractal Dimension to characterize interactions between blood and lymphatic endothelial cells", *Physical Biology*, 20: 045004(2023).
307. Huang, C.-K., Lin, Y.-N., Huang, W.-S., Senapati, S., Chang, H.-C., Sun, Y.-M. and Huang, L.-F., "RNA-Based Detection of Genetically Modified Plants via Current-Voltage Characteristic Measurement", *Journal of Biotechnology*, 383:27-38(2024).
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309. Kumar, S., Senapati, S. and Chang, H.-C., "Extracellular Vesicle and Lipoprotein Diagnostics (ExoLP-Dx) with Membrane Sensor: A robust microfluidic platform to overcome heterogeneity", *Biomicrofluidics*, 18:041301(2024).
310. Dubrovski, O., Yang, J., Veloso, F., Go, D. B.*, Chang, H.-C.* and Rumbach, P.*, "Non-Capillary Wave Dynamics due to Interfacial Coupling with Plasma Patterns at a Liquid Surface", *Phys Rev Lett*, 133:105301(2024). (**Editor's Suggestion**)
311. Johnston, J., Jeon, H., Choi, Y. Y., Kim, G., Shi, T., Khong, C., Chang, H.-C., Myung, N. C. and Wang, Y., "Stimulative Piezoelectric Nanofibrous Scaffolds for Enhanced Small Extracellular Vesicle Production in 3D Cultures", *Biomaterials Science*, 12:5278 (2024).
312. Ren, X., Zhou, R., Ronan, G., Ozcebe, S. G., Ji, J., Senapati, S., March, K. L., Handberg, E., Anderson, D., Pepine, C. J., Chang, H.-C., Liu, F. and Zorlutuna, P., "Towards Real-Time Myocardial Infarction Diagnosis: A Convergence of Machine Learning and Ion-Exchange Membrane Technologies Leveraging miRNA Signatures", *LabChip*, 24: 5203 (2024).
313. Sharma, H., Yadav, V., Burchett, A., Shi, T., Senapati, S., Datta, M. and Chang, H.-C., "A Mem-dELISA Platform for Dual Color and Ultrasensitive Digital Detection of Colocalized Proteins on Extracellular Vesicles", *Biosensors and Bioelectronics*, 267: 116848(2025).
314. Montes, D., Saha, S., Taglione, A., Jeong, D. P., Chen, L., Fan, F., Chang, H.-C.* and Hanjaya-Putra, D.*; "Tuning the Morphological Properties of Granular Hydrogels to Control Lymphatic Capillary Formation", *Advanced Materials Interfaces*, 2401037 (2025) (**Inside Cover**)
315. Safavisohi, R., Johnson, J., Liu, Y., Yang, J., Hilliard, T. S., Wang, Z., Barile, C., Mijares, J., Wang, C., Chang, H.-C., Whelan, R. J. and Stack, M. S.; "Peritoneal Cavity-Derived Small Extracellular Vesicles from Aged Tumor-Naive Hosts promote Ovarian Cancer Adhesion and Invasion", *Cell Communication and Signaling*, 23:308 (2025).
316. Cheng, C.-H., Yatsuda, H., Liu, S.-H., Tsai, W.-N., Cheng, T.-S., Chen, S.-Y., Huang, C.-Y. F., Chang, H.-C. and Kondoh, J.; "An Approach for Measuring Extracellular Vesicle Size Using Attenuation-Velocity Change Ratio of SH-SAW Biosensors", *Analytical Chemistry*, 97:15234-15243 (2025).
317. Kumar, S., Sinclair, J. A., Shi, T., Chuang, H.-C., Senapati, S. and Chang, H.-C., "Immunojanus Particles for Low-Volume and Isolation-Free Unbiased Characterization of small Extracellular Vesicle in Biofluids: Characterization of Disease Type by Surface Marker Profiling", *Nature Biomedical Engineering* (in press). <https://www.biorxiv.org/content/10.1101/2024.08.17.607528v2>

Invited Seminars and Keynote/Plenary Talks (over 200)

Chemical Engineering department unless otherwise specified (~90 department seminars in the US; 80 internationally)

1. "A Singular Perturbation Analysis of the Dynamics of Two-Species Heterogeneous Catalytic Reactions," University of California at Davis, 1980.
2. "Quasi-Steady-State Analysis of Heterogeneous Catalytic Systems," University of Houston, 1980.
3. "Multi-Scale Analysis of Global Dynamics in Heterogeneous Catalytic Systems," University of Southern California, 1982.
4. "The Nonlinear Effects of Stabilizing an Unstable Reactor by Linear Feedback Control," Notre Dame, 1983.
5. "Nonlinear Dynamic Behavior in Chemical Systems," Texas A & M, 1983.
6. "High Reynolds Number Flow Through Cubic Arrays of Spheres," University of California, San Diego, 1983.
7. "Transport in periodic Arrays of Spheres and Cylinders," University of Houston, 1984.
8. "Bifurcations of a Falling Liquid Film," University of Wisconsin, 1984,
9. "Evolution on Nonlinear Waves on Falling Films - A Normal Analysis," University of Massachusetts, 1985.
10. "Effective Conductivity and Diffusivity in Two-Phase Media," Michigan State University, 1985.
11. "Nonlinear Interfacial Instability," Schlumberger-Doll, Ridgefield, Connecticut, 1985.
12. "Modeling of Flow in Permeable Media," Gordon Research Conference, New Hampshire, 1986.
13. "A Galerkin/Spectral Analysis of Flow Transition in Several Model Systems," Princeton University, 1986.
14. "Nonlinear Dynamics of Systems Under PID Control," University of Texas, Austin, 1986.
15. "Design of PID Controllers for Nonlinear Systems-A Model Independent Method Based on Bifurcation Theory," Caltech, 1986.
16. "Flow Transition in Porous Media," University of Notre Dame, 1987.
17. "PID Control of Nonlinear Systems," University of Pennsylvania, 1987.
18. "Tuning of PI Controllers for Unknown Systems," East China Institute of Chemical Technology, 1987.
19. "Nonlinear Waves on Falling Films," East China Institute of Chemical Technology, 1987.
20. "Flow Transition in Porous Media", Mathematics Institute, Academia Sinica, Taiwan 1988.
21. "Bubble Transport in Capillaries", **Colburn Lectureship**, University of Delaware, 1988.
22. "General Dynamic Properties of Nonlinear Systems under PI Control", National Taiwan University, 1988.
23. "Bubble Transport in Capillaries", National Taiwan University, 1988.
24. "Nonlinear Dynamics of Systems Under Feedback Control", Illinois Institute of Technology, 1989.
25. "The Marangoni Effect on the Transport of Bubbles in Capillaries", Engineering Science and Applied Math Dept., Northwestern University, 1990.
26. "Apparent Viscosity of Bubble Trains in Capillaries", Rheology Seminar, University of Wisconsin, 1990.
27. "A Generalized Sideband Stability Theory", Aerospace Engineering and Mechanics Dept., University of Minnesota, 1990.
28. "Selection of Periodic Patterns in Unbounded Domains", Institute of Theoretical Chemistry, University of Tubingen, Germany, 1990.
29. "Selection of Periodic Patterns in Unbounded Domains", Institute of Paper Science and Technology, Georgia Institute of Technology, 1990.
30. "Displacement of Liquid by Air Bubbles in Capillaries - the Marangoni Effect", Clarkson University, 1990.
31. "Displacement of Liquids by Air Bubbles in Capillaries - the Marangoni Effect", MIT, 1991.
32. "Bifurcation of a Torus in a Delayed Feedback System", Institute of Control Science, USSR Academy of Science, Moscow, 1991.
33. "Heat Transfer Enhancement by Chaotic Mixing", Physics, Argonne National Laboratory, 1991.
34. "Transition and Pattern Formation in Multi-Phase Channel Flow," Cornell University, 1991.
35. "Interfacial Patterns and Invariant Manifolds", Applied Math. Group, Cornell University, 1991.
36. "Spatial Patterns in Two-Phase Flow", University of Iowa, 1992.
37. "Pattern Formation in Multi-Phase Flow", Mathematics Department, Virginia Tech, 1992.
38. "Interfacial Wave Dynamics on Thin Films", **James and Catherine Pattern Seminar**, University of Colorado, Boulder, 1992.
39. "Interfacial Wave Dynamics", West Virginia University, 1992.
40. "Surface-Tension Driven Flow", West Virginia University, 1992.

41. "Spatio-Temporal Chaos and Control on a Catalytic Wafer", National Taiwan Institute of Technology, Taipei, December 22, 1992.
42. "Heat Transfer Enhancement by Chaotic Mixing", National Taiwan University, Taipei, December 22, 1992.
43. "Heat Transfer Enhancement by Chaotic Mixing", National Tsing Hua University, Hsinchu, December 23, 1992.
44. "Interfacial Chaos", Tunghai University, Taichung, December 23, 1992.
45. "Instabilities in Free Convection Near a Heated Plane", National Cheng Kung University, Tainan, December 26, 1992.
46. "Displacement of Liquid by Air Bubbles in Capillaries", National Cheng Kung University, Tainan, December 28, 1992.
47. "Heat-Transfer Enhancement by Chaotic Mixing", Aeronautical Department, National Cheng Kung University, Tainan, December 29, 1992.
48. "Spatio-Temporal Chaos and Control on a Catalytic Wafer", National Cheng Kung University, Tainan, December 30, 1992.
49. "Interfacial Chaos", Mechanical Engineering Department, National Cheng Kung University, Tainan, December 31, 1992.
50. "Wave Evolution on a Falling Film," Department of Applied Mathematics and Theoretical Physics, Cambridge University, October 22, 1993.
51. "Wave Evolution on a Falling Film," Prague Institute of Chemical Technology, October 26, 1993.
52. "Wave Evolution on a Falling Film", Department of Mathematics, University of Birmingham, November 19, 1993.
53. "Self-similar Solutions in Interfacial Dynamics", Carnegie-Mellon, January 25, 1994.
54. "Interaction Dynamics of Solitary Waves on a Falling Film", Complex Fluid Seminar Series, Princeton University, Sept. 26, 1994.
55. "Waves on a Falling Film", Levich Institute of Hydrodynamics, City College of New York, Sept. 27, 1994.
56. "Wave Dynamics on a Falling Film", University of Missouri-Rolla, March 29, 1995.
57. "Wave Evolution on a Falling Film", Spatially Extended Conference on Complex Dynamics in Spatially Extended Systems, Niels Bohr Institute, Denmark, Sept. 26, 1995.
58. "Wave Dynamics on a Falling Film", University of Wisconsin, January 24, 1996
59. "Self-Similarity in Interfacial Dynamics", Physics Department, University of Chicago, April 15, 1996.
60. "Falling Film Dynamics," Mathematics Department, University of Alabama, May 1, 1996.
61. "A Description of Film Wave Dynamics by Coherent Structure Theory", Applied Mathematics Department, Northwestern University, May 12, 1997.
62. "Pattern Formation During Electropolishing", Fritz-Haber-Institut der Marx-Planck-Gesellschaft, Berlin, July 21, 1997.
63. "Drop Formation in Viscoelastic Jets", Department of Mathematical Sciences, Indiana/Purdue University, Indianapolis, October 15, 1997.
64. "Drop Formation and Pinchoff in Viscoelastic Jets", Mech. Eng. Dept., Arizona State University, November 21, 1997.
65. "Wave Dynamics on Thin Films", "Pattern Formation in Corrosion and Electropolishing" and "Breakup of Viscoelastic Jets", Mathematics and Engineering Departments, Institute of Technology at Bandung, Indonesia, January 7-9, 1998.
66. "Wave Dynamics on a Falling Film", Mech. Eng. Dept., MIT, February 27, 1998.
67. "Modulation Instability of Kinematic Interfacial Waves", Mech. Eng. Dept., UCLA, May 14, 1998.
68. "Wave Dynamics on a Falling Film", UCLA, May 15, 1998.
69. "Homogenization and Scaling Theories for Molecular Transport in Zeolites", University of Naples, June 16, 1998.
70. "Arnold Diffusion in Zeolite Crystals", Aerospace and Mechanical Engineering Dept., University of Notre Dame, Aug. 31, 1999.
71. "Nanoscale Pattern Formation During Electrode Dissolution", University of Florida, Oct. 18, 1999.
72. "Nanoscale Pattern Formation During Electrode Dissolution", University of Houston, November 19, 1999.
73. "Fast-Igniting Catalytic Converters", Iowa State, March 2, 2000.
74. "Nanoscale Pattern Formation", Fritz-Haber-Institut der Marx-Planck-Gesellschaft, Berlin, June 16, 2000.

75. "Fast-Igniting Catalytic Converters", Department of Mathematics, University of Minnesota, Minneapolis, September 7, 2000; Nonlinear Dynamics Seminar Series, Applied Math Program, Princeton University, October 23, 2000.
76. "Fast-Igniting Catalytic Converters", Department of Mathematics, New Jersey Institute of Technology, Newark, November 3, 2000.
77. "Fast-Igniting Catalytic Converters", Mathematics Department, Chinese Normal University, Taipei, Taiwan, December 27, 2000.
78. "Microdevices and Nanoporous Materials", College of Engineering, Yuan Ze University, Taiwan, December 28, 2000.
79. "Microfluidics", Chemical Engineering, National Taiwan University, Dec 18, Chung Cheng University, Dec 20, Cheng Kung University, Dec 22, Changan Hospital and University, Dec 24, Taiwan, 2001.
80. "Microfluidics", National Seoul University, January 8, KAIST, January 10, KIST, January 11, Korea, 2002.
81. "Wave Dynamics on Thin Films", Department of Mathematics, Penn State, February, 2002.
82. "Electrokinetic Microfluidics", **Stanley Corrsin Hydrodynamics Lecture**, Johns Hopkins University, March 7, 2002.
83. "Electrokinetic Microfluidics", University of Wisconsin, April 9, 2002.
84. "Nonlinear Electrokinetic Phenomena and their Microfluidic Applications", Mechanical Engineering Dept, Louisiana State University, September 18, 2002.
85. "Bioparticle Separation and Detection with Micro-Devices", Applied Science Division, Academia Sinica, Taipei, Taiwan, December 26, 2002.
86. "Miniature Medical Diagnostic Kits", National Nano-Device Laboratory, Hsin-Chu, Taiwan, December 27, 2002.
87. "Application of Electrokinetics to Micro-Fluidic Devices", Carnegie-Mellon, Feb 18, 2003.
88. "Engineering Double Layers to Control Electro-Dissolution Processes", Ashland Research Laboratory, Columbus, Ohio, April 16, 2003.
89. "Nano-scale Dissolution Patterns During Electropolishing and Anodization", Argonne National Laboratory, Material Science Division, May 1, 2003.
90. "Nonlinear Electrokinetics and Microfluidic Devices", Workshop on Complex Fluids, Argonne National Laboratory, July 28 to 31, 2003.
91. "Application of Electrokinetics in Micro-fluidic Devices", University of Minnesota, Oct 7, 2003.
92. "Application of Electrokinetics in Micro-fluidic Devices", Michigan Tech, Oct 23, 2003.
93. "Application of Electrokinetics in Micro-fluidic Devices", National Tsinghua University, Dec 18, 2003.
94. "Application of Electrokinetics in Micro-fluidic Devices", National Taiwan University, Dec 24, 2003.
95. "Application of Electrokinetics in Micro-fluidic Devices", Center of Bioengineering and Mechanical Engineering Department, University of Missouri, April 6, 2004.
96. "Non-equilibrium Electrokinetics", Department of Aerospace and Mechanical Engineering, University of Notre Dame, Sept 28, 2004.
97. "AC Electrokinetic Devices", Department of Bioengineering, Rice University, December 11, 2004.
98. "Microfluidic Designs for Miniature Medical Diagnostic Kits", Keynote Lecture, (Taiwan) Biomedical Engineering Society Annual Symposium, Tainan, Taiwan, December 18, 2004.
99. "Electrokinetic Microdevices", Cheng-Kung University, Tainan, Taiwan, Dec 20, 2004.
100. "Miniature Blood Diagnostic Kits", Department of Biomedical Engineering, Cheng-Kung University, Tainan, Taiwan, Dec 21, 2004.
101. "Microfluidic Designs for Miniature Medical Diagnostic Kits", College of Engineering Honor Lecture, Chong-Cheng University, Chia-Yi, Taiwan, Dec 24, 2004.
102. "Microfluidic Technology for Rapid Diagnostic Kits", Bioengineering Department, Rice University, January 31, 2005.
103. "Rapid Diagnostic Kits for Cancer Detection", Han-Mo Koo Memorial Seminar, Van Andel Research Institute, Grand Rapids, Feb 9, 2005.
104. "Microfluidic Technology for Rapid Diagnostic Kits", University of Alberta, March 17, 2005.
105. "Microfluidic Technology for Rapid Diagnostic Kits", Invited Speakers, Biosensor Symposium, Indianapolis, April 6, 2005.
106. "Microfluidic Technology for Rapid Diagnostic Kits", University of Houston, April 15, 2005.
107. "Microfluidic Technology for Rapid Diagnostic Kits", Tsinghua University, Beijing, May 12, 2005.

108. "Thin Films of Soft Matter", The Bianchi Session, International Center for Mechanical Sciences, Udine, Italy, July 18 to 22, 2005.
109. "Designing DC and AC Electrokinetic Devices for Miniature Diagnostic Kits", Univ. of Mass, Amherst, Oct 6, 2005.
110. "Manipulating Nanobeads and Nanorods with Micro-Electrodes to Capture, Detect and Identify Virus/Bacteria", International Symposium on Nano Bioengineering, Chung-Li, Taiwan, Dec 15-16, 2005.
111. "AC Electrokinetics due to Double Layer Charging", Exxon-Mobil and Levich Institute, October 23 and 24, 2006.
112. "Directed Assembly of Colloids by AC Electrokinetics", NSF-NSC US/Taiwan Workshop on Soft Materials, Taipei, Jan 4-6, 2007.
113. "Dielectrophoresis: Double-Layer Effects", Invited Speaker, Material Research Society, San Francisco, April 13, 2007.
114. "Dielectrophoresis of Nano-Colloids---a New Microfluidic Platform for Biomedical Diagnostic Kits", Monash University, University of Queensland and Melbourne University, Australia, May 21-29, 2007.
115. "Dielectrophoresis of Nano-Colloids", Sandia National Lab., September 24; Bioengineering Department, UC Davis, September 25, 2007.
116. "Dielectrophoresis of Nano-Colloids", Caltech, Oct, 18, 2007.
117. "Dielectrophoresis of Nano-Colloids", HKUST, Hong Kong, January, 2008; Academia Sinica, National Taiwan University, Cheng Kung University, Central University, Taiwan, March, 2009.
118. "Dielectrophoresis of Nano-Colloids", Princeton, April 23, 2008.
119. "AC Electrospray", Kavli Institute of Physics, Beijing, June, 2008.
120. "Understanding Electrokinetics at the Nanoscale", Mechanical Engineering department, University of Houston, February 2009.
121. "Understanding Electrokinetics at the Nanoscale", SEAS, University of Pennsylvania, April, 2009.
122. "Understanding Electrokinetics at the Nanoscale", Chinese Academy of Science, Applied Science Institute, Shanghai, July 2009.
123. Keynote Lecturer, ACS Colloid and Interfacial Science Symposium, Columbia University, June 2009.
124. Keynote Lecture, ASME Mini/Micro/NanoChannels Conference, Pohang, Korea, June 2009.
125. Keynote Lecture, Asian-Pacific LabChip Conference, Shanghai, October 2009.
126. Invited Speaker, Workshop on Electrokinetics, IMA, University of Minnesota, Dec 2009.
127. Keynote Lecturer, Second ASME Micro/Nanoscale Heat/Mass Transfer International Conference, Jiaotong University, Shanghai, December 2009.
128. Invited Speaker, Electrokinetics Conference, Banff, February 2010.
129. "Rapid Label-Free Molecular Detection by Electrokinetics", EPA, Cincinnati, April 2010.
130. "Nanofluidics", Academia Sinica, Taiwan, June, 2010; National Tsing-Hua University, June, 2010. National Cheng Kung University, June, 2010.
131. "Vortices and Instabilities at the Micro/Nanoscale", **Plenary Lecture**, Wave Phenomena IV, Banff, Canada, June 2010.
132. "Polaritons at Geometric Singularities", Invited Speaker, Phoresis Workshop, Pohang, Korea, August 2010.
133. "Nanoporous Membrane Sensors for Portable Nucleic Acid Detection", **Plenary Speaker**, Chinese-Japan-Korea Analytical Chemistry Conference, Wuhan, October 2010.
134. "Polaritons at Geometric Singularities", **Plenary Speaker**, Electrokinetics Workshop, Haifa, Israel, December 2010.
135. "A new Nucleic Acid Detection Platform based on Nanoporous Membranes", **Plenary Speaker**, AMN-APLOC, Singapore, January, 2011.
136. "A Nanofluidic Platform for Cancer Biomarker Detection", Nano-Air Force Workshop, Seattle, March, 2011.
137. "Micro and Nanofluidics for Mass Spectrometry and Biosensing", Mechanical Engineering Department, University of Louisville, March, 2011.
138. "Polaritons and Geometric Singularities", Nanofluidics Colloquium, Physics department, Universitat Twente, June 2011.
139. "Electrokinetic Biochips", Imperial College, June 2011.
140. "Electrokinetic Biosensors", Mechanical Engineering, University College, London, June 2011.
141. "Non-Equilibrium Nanofluidics: Rectification, Overlimiting Current and MicroVortex Instability", Engineering, Brown University, September 2011.

142. “Rectification, Hysteresis and Oscillations in Nanofluidics”, Invited Speaker, Electrokinetics Symposium, APS-DFD Annual Meeting, Baltimore, November 2011.
143. “Microvortex Turbulence Driven by Non-Equilibrium Ion Flux through Ion-Selective Media”, Fluid Seminar, Stanford University, January, 2012.
144. “Nanoporous Membrane Sensor”, Plenary Lecture, Advances in Microfluidics and Nanofluidics, Dalian, China, May, 2012.
145. “Low-Cost Membrane Sensors for Portable Diagnostics”, Marine Environmental Sensing Center, Dublin City University, Aug 30, 2012.
146. “Anomalous Phenomena at Geometric Singularities”, Physics Department, University of Missouri, September 17, 2012
147. “Ion Rectifiers, Capacitors and Inductors”, Mechanical Science and Engineering, University of Illinois, Urbana, September 18, 2012.
148. “Electrokinetic Technologies for Portable Diagnostic Devices”, Ohio State University, November 15, 2012.
149. “Next-Generation Molecular Diagnostics”, Bionics Innovation Center, Pazmany P. Catholic University, Budapest, September 17, 2013.
150. “Field-Use Nucleic Acid Sensors”, Bioengineering, University of Texas, El Paso, October 11, 2013.
151. “Next-Generation of Diagnostic Devices”, Bionics Center, Budapest, Sept 17, 2013.
152. “Next Generation Molecular Diagnostics”, Suzhou Institute of Biomedical Engineering and Technology, Oct 23, 2013.
153. “Next Generation Molecular Diagnostics”, Plenary Talk, International Conference of Applied Science, Academia Sinica, Taiwan, Oct 25, 2013.
154. “Nanoporous Membrane Biosensor”, Mechanical Engineering Department, Clemson University, Nov 21, 2013.
155. “Nanoparticle Assembly for Plasmonic Biosensing”, Foundations of Nano Science, Snowbird, Utah.
156. “Membrane Microfluidics”, Advances in Microfluidics and Nanofluidics, Academia Sinica, Taipei, May 24-26, 2014.
157. “Membrane Microfluidics”, Dielectrophoresis 2014, Institute of Physics, London, July 14-16, 2014.
158. “Ultra-Sensitive Biosensing with Nanopore Ion-Currents and Nanoparticle Plasmonics” Keynote Speaker, China-German Optical Medical Devices Conference, Suzhou, Sept 18-19, 2014.
159. “Next-Generation Point-of-Care Diagnostics”, Workshop on Bionics, Bionics Center, Pazmany Peter Catholic University Budapest, Oct 21-23, 2014.
160. “Next-Generation Point-of-Care Diagnostics”, Keynote Lecture, Taiwan Institute of Chemical Engineers Meeting, Taoyuan, Taiwan, Dec 13, 2014.
161. “Next-Generation Point-of-Care Diagnostics”, Applied Sciences Division, Academia Sinica, Taiwan, Feb 6, 2015.
162. “Next-Generation Point-of-Care Diagnostics”, University of Chile, Santiago, Chile, March 9, 2015. Catholic University, Santiago, Chile, March 11, 2015.
163. “Next-Generation Point-of-Care Diagnostics”, **Plenary Speaker**, 7th WACBE World Congress on Bioengineering, Singapore, July 6, 2015.
164. “Portable Nucleic Acid Sensors”, BioselectMicrofluidic Congress, San Diego, Sept 2015.
165. “Nucleic Acid Assay: How to beat Thermodynamic Equilibrium”, Bioengineering Department, University of California, San Diego, September 30, 2015.
166. “Integrated Membrane Sensor”, Plenary Speaker, Annual Meeting of American Electrophoresis Society, Salt Lake City, November 2015.
167. “Ionic Circuits”, Electrical Engineering Department, University of Utah, November 5, 2015.
168. “Next-Generation Point-of-Care Diagnostics”, National University of Singapore, January 2016; IMRE, ASTAR, Singapore, January 2016.
169. “Membrane Microfluidics for miRNA Profiling”, Mechanical Engineering, University of Pittsburgh, March 2016.
170. “A Billion-Droplet Digital PCR Platform”, Keynote lecture, Microfluidics Congress, San Diego, September 2016.
171. “Ionic Circuits for Molecular Analysis”, Keynote lecture, Bionics Center PhD Congress Budapest, Hungary, November 2016.
172. “Ionic Circuits for Molecular Diagnostics”, Physics of Microfluidics, Israel, January 2017.

173. "Nanotechnology for Exosome and miRNA Isolation/Quantification," Notre Dame Harper Cancer Institute-USC Norris Cancer Center retreat, University of Southern California, February 9, 2017.
174. "Biochips for Short Nucleic Acid Quantification Based on Nonlinear Ionic Circuitries with Perm-Selective Membranes", Mechanical Engineering, University of Alberta, April 2017.
175. "Biochips for Short Nucleic Acid Quantification Based on Ion-Selective Nanoporous Membranes and Nanopores," Materials Week, Ohio State University, May, 2017.
176. "Nanopore Translocation and Unbiased miRNA Profiling," **Plenary Talk**, AMN-ISMN-APCBM-ANZNMF conference, Tasmania, Australia June 29, 2017
177. "Nanopore Quantification of miRNA", Plenary Talk, Microfluidics Congress, San Diego, October 2, 2017.
178. "Towards quantification of large-library biomarkers for personalized medicine", **Plenary Talk**, Advances in Pharmaceutical Analysis, Wuhan, November 18, 2017.
179. "Nanopore miRNA profiling Technology", **Plenary Talk**, Microfluidics Workshop Chinese Academy of Science, Institute of Modern Physics, Lanzhou, June 13, 2018.
180. "Biosensors based on nonlinear ionic circuits, **Distinguished lecture**, Department of Mechanical Engineering, Boston University, September 14, 2018.
181. "PCR-Free MicroRNA Quantification Based on Ion-Selective Nanoporous Membranes and Nanopores", Plenary talk, 10th Annual Lab-on-a-Chip and Microfluidics Congress, San Diego, October 1, 2018.
182. "Electrokinetics and Plasmonics at NanoScale Singularities", Invited Talk, TIX Conference, Haifa, Israel, December 4, 2018.
183. "Electrokinetics and Plasmonics at NanoScale Singularities: Designing Next-Generation Molecular Diagnostics", Okinawa Institute of Science & Technology, Okinawa, December 20, 2018.
184. "High-yield Isolation and Quantification of Exosomes and Exosomal miRNA", International Molecular Medicine Tri-Conference, San Francisco, March 11, 2019.
185. "Nanofluidic Technologies for Nanocarrier Biomarkers", Mechanical Engineering, Vanderbilt University, September 9, 2019.
186. "Droplet Generation based on Electrokinetics" and "Multiplex Liquid Biopsy Platform for Fractionation of Heterogeneous Vesicles and Precision Analyses of RNA Cargo", Keynote talks, Annual Lab-on-a-Chip and Microfluidics Congress, San Diego, October 9-10, 2019.
187. "Fractionation and Analyses of Exosomes", Lifetime Achievement Award Lecture, Annual Meeting of American Electrophoresis Society, Palm Springs, Oct 16, 2019.
188. "Liquid Biopsy based on RNA Profiling of Exosomes and Stress Granules in Plasma", **Plenary Lecture**, 3rd International Symposium on Advances in Pharmaceutical Analysis, Xian, October 25, 2019.
189. "Fractionation of Nanocarriers and Quantification of their Molecular Cargo", Indiana Center for Regenerative Medicine and Engineering, Indiana University Medical School, November 22, 2019.
190. "Isolation and Fractionation of Blood Exosomes and Profiling of miRNA for Precision Medicine Applications", Molecular Medicine Tri-Conference, San Francisco, March 4, 2020.
191. "An Automated High-Throughput Multiplex Detection Platform for on-line Monitoring of Protein Finger Prints", Advanced Manufacturing Regenerative Initiative Spring Meeting, May 19, 2020.
192. "Isolation and Fractionation of Exosomes and Viruses", Washington State University, October 15, 2020 (Virtual).
193. "On-Line Monitoring of Biomarkers in Tissue Cultures", Invited Panelist, Biomanufacturing Symposium, University of Virginia in Charlottesville, Oct 17, 2021.
194. "Molecular Diagnostics based on Electrokinetics", Invited Speaker, Elkin 2022, University of Tel-Aviv, Israel July 4-6, 2022. (Declined)
195. "Nanotechnologies for Isolating and Characterizing Extracellular Nanocarriers of Cancer Biomarkers", Center for Bioinformatics and Quantitative Biology, University of Illinois at Chicago, Chicago, September 12, 2022.
196. "Nanotechnologies for Isolating and Characterizing Extracellular Nanocarriers of Cancer Biomarkers", Physical Sciences Onco-development colloquium, University of Pennsylvania, October 10, 2022.
197. "An Ionic Field-Effect Transistor Sensor based on Permselective Membranes", **Plenary Speaker**, International Conference on Smart Sensors 2022, Taichung, Taiwan, October 22, 2022.
198. "Nanotechnologies for Isolating and Characterizing Therapeutic Exosomes and other Nanocarriers", Institute of Biopharmaceutical Science, National Yang Ming Chiao Tung University, Taiwan, December 14, 2022.

199. “Smart Cell Cultures”, The Association of Chemical Sensors in Taiwan, Tunghai University, Taiwan, December 23, 2022.
200. “Nanotechnologies for Isolating and Characterizing Extracellular Nanocarriers of Biomarkers”, Biomedical Translation Research Center, Academia Sinica, Taipei, December 29, 2022.
201. “Nanotechnologies for Isolating and Characterizing Extracellular Nanocarriers of Biomarkers”, Far Eastern Memorial Hospital, Taipei, Dec 30, 2022.
202. “Nanotechnologies for Fractionation, Purification and Characterization of Extracellular Vesicles”, Keynote, Select Bio Circulating Biomarker and Extracellular Vesicles Europe, Rotterdam, Holland, June 19, 2023
203. “Nanotechnologies for Fractionation, Purification and Characterization of Extracellular Vesicles”, Ohio State, October 26, 2023
204. “Nanotechnologies for Fractionation, Purification and Characterization of Extracellular Vesicles”, Invited Speaker, IEEE Nanomed, Okinawa, December 5-8, 2023 (declined due to conflict).
205. “Nanocarrier Diagnostics for Cancer Screening”, National Yang Ming Chiao Tung University, Taiwan, December 11, 2023.
206. “Electrokinetic Isolation and Characterization of Biomarker Nanocarriers in Physiological Fluids: Exosomes and Beyond”, Keynote Speaker, ACS Colloid and Surface Science Symposium, Seattle, June 23-26, 2024.
207. “Electrokinetic Isolation and Characterization of Biomarker Nanocarriers in Physiological Fluids: Exosomes and Beyond”, Rutgers Center for Computational and Integrative Biology, Rutgers-Camden, April 1, 2025.
208. “Technologies for Purifying and Identifying Extracellular Vesicles: Parsing Heterogeneity”, Keynote Presentation, SelectBIO Conference, Miami, May 15-16, 2025.
209. “Extracellular Vesicle and Organoid Technologies for Drug Screening and Design”, Warren Center, University of Notre Dame, Oct 2, 2025.
210. “A Diagnostic Platform for Biomarker Nanocarriers”, Physical/Analytical Chemistry seminar, University of Notre Dame, Nov 13, 2025.
211. “Extracellular Vesicle Diagnostics”, Plenary Lecture, SelectBIO EV Asia, Shenzhen, Jan 23, 2026.
212. “Size-Based Quantification of Extracellular Vesicle and Viruses in Untreated Plasma/Urine by Brownian Rotation of Janus Particles”, Plenary Lecture, SelectBIO Microfluidics Asia, Shenzhen, Jan 23, 2026.

Funded Research (Over \$30 million, >\$17 million since 2015)

NSF, NIH, DOE, DOD, NASA, ARMI, USDA, IBM, ExxonMobil, Schlumberger, Naval Medical Lab, Air Force Office of Research, Army Corp of Engineering, DTRA, ACS-PRF, Great Lakes Conservation Agency, Welch Foundation, Walter Cancer Foundation, Far Eastern Foundation, Gas Research Institute, TAPPI, Kraft Foods, Bayer Diagnostics, US-Israel BSF.

- > "Perturbation Analysis of Heterogeneous Catalytic Dynamics," NSF, 1981-1984, \$50,000.
- > "Analysis of Transient Behavior in Chemical Engineering," ACS-PRF, 1981-1983, \$10,000.
- > "Transport in Porous Media - Steady and Dynamic Behaviors in Inertial and Turbulent Regions," ACS-PRF, 1984-1986, \$33,000.
- > "Washing and Plugging Mechanism in Formation Damage," Schlumberger Well Service, 1985-1986, \$20,000.
- > "Application of Nonlinear Techniques to Control and Fluid Dynamics - **PYI Award**," NSF, 1985-1990, \$500,000. (REU Supplement: \$15,000)
- > "Enhanced Oil Recovery Consortium," 1985-1987, \$95,000/year from industrial sponsors, \$50,000/year from state funds. (PI: H. Deans).
- > "Dynamic Modeling of CO Oxidation on Platinum," The Robert A. Welch Foundation, 1986-1987, \$60,000.
- > "High Reynolds Number Flow in Porous Media," ACS-PRF, 1986-1988, \$35,000.
- > "Dielectric Breakdown Due to Electrothermal Instability," Jesse M. Jones Faculty Research Fund, 1988-1989, \$10,000.
- > "Stability of Core-Annular Flow in Lubricated Transport of Oil", ACS-PRF, 1988-1990, \$40,000.
- > "Enhancement of Heat Transfer by Chaotic Mixing", Gas Research Institute, 1990-1993, \$300,000.
- > "Nonlinear Dynamics and Control of Complex Patterns", NSF, 1991-1994, \$200,000.
- > "Hydrodynamic Instability of Forming", TAPPI, 1992, \$40,000.
- > "Wave Dynamics on Falling Films and Its Effects on Heat/Mass Transfer", DOE, 1992-1995, \$185,000.
- > "Thermal Front Propagation of Fast Igniting Catalytic Converters", 1992-1995, NSF, \$250,000. (REU Supplement: \$15,000)
- > "Study of disturbances in fluid-fluid flows in open and closed systems", NASA, 1992-1995, \$300,000.
- > "Fundamental Processes of Atomization in Fluid-Fluid Flows", NASA, 1996-2000, \$520,000.
- > "Nonlinear Dynamics and Control," NSF, 1996-1999, \$170,000. (REU Supplement: \$20,000)
- > "When are Hexagons Preferred," Faculty Research Program, 1997, \$7,500.
- > "Electrochemical Self-Organization," NSF, 1997-2000, \$220,000.
- > "Molecular Design of Lubricants", Mobil Foundation, 1998-2000, \$30,000.
- > "Wave-Enhanced Heat and Mass Transfer", NSF, 1998-2000, \$160,000. (REU Supplement: \$5,000)
- > "Electrokinetic Flow Design for Micro-Laboratories on a Chip", NSF, 1999-2002, \$400,000.
- > "Self-Assembly During Evaporation of Colloidal Solutions", Kraft Food, 1999-2002, \$65,000.
- > "Effects of Local Interfacial and Flow Dynamics on Foam Drying and Coarsening", NSF, 2001-2003, \$488,000.
- > "Colloidal Microfluidics for Diagnostic Kits", Bayer Diagnostics, 2001, \$5,000.
- > "Microcirculation Anomalies in Microgravity Blood Flow", NASA, 2001-2005, \$400,000 .

- > “Fuel Cell Research”, Army, 2003-2006, **\$1,600,000** (PI: P. J. McGinn), 10 PI’s with \$290,000 towards microfluidics research.
- > “Micro-Fuel Cells”, 21st Century Fund, State of Indiana, 2004-2006, \$1,000,000 (PI: P. J. McGinn).
- > “Center for Microfluidics and Medical Diagnostics”, University of Notre Dame, 2003-2007. \$400,000.
- > “Electromagnetically Controlled Self-Assembly of Nano and Micro Collloids for Miniature Medical Diagnostic Kits”, Notre Dame-Argonne Frontiers in Material Science Grant, 2003-2005, \$200,000.
- > “Faradaic Micro-fluidic Devices for Complex Fluids”, NSF, 2005-2007, \$100,000.
- > “Protein Micropump”, SHOT Inc., 2005-2007, \$48,000.
- > “Silica Beads for Rapid and Reversible Virus and Bacteria Trapping”, Scientific Methods Inc., 2005, \$20,000. (EPA-SBIR Phase I).
- > “Risk assessment and management of the Great Lakes species”, Great Lakes Protection Fund, 2006-2009, **\$1,090,000**, (PI: D. Lodge).
- > “Developing and Applying a Portable Real-Time Genetic Probe for Detecting Aquatic Invasive Species in Ship’s Ballast, Great Lake Protection Fund, 2007-2010, \$805,000, (PI: D. Lodge).
- > “Microfilters for Nano-Aerosol Filtration”, Defense Threat Reduction Agency, 2008-2011, \$652,217.
- > **“Collaborative Research:** Development of a Biofluid Transport, Separation and Molecular Analysis System using Microfluidics and a Miniature Mass Spectrometer”, National Science Foundation, 2009-2011, **\$1,500,000**, PI: P. W Bohn (with G. Cooke and Z. Ou-yang) joint Purdue-ND project.
- > “Novel malaria vaccine targets linked to nutrient and lipid import”. Gates Foundation Phase 1, 2009-2010, \$100,000 (PI: K. Haldar).
- > “Novel Microsystems for Manipulation and Analysis of Immune Cells: **Emerging Frontiers in Research and Innovation**”, National Science Foundation, 2009-2013, **\$2,000,000**, (PI: A. Revzin).
- > “Dielectrophoresis of Nanocolloids: A New Technique for Capturing Biomolecules and Biomarkers”, United States-Israel Binational Science Foundation, 2010-2014, \$156,975.
- > “A Nanomembrane-Based Nucleic Acid Sensing Platform”, National Science Foundation, 2011-2014, \$325,000.
- > “Nanofluidic Pre-concentration Devices for Enhancing the Detection Sensitivity and Selectivity of Biomarkers for Human Performance Monitoring”, Air Force Office of Scientific Research, 2011-2014, \$200,000 (PI: N. Swami).
- > “A Rapid and High-Throughput Pathogen RNA Detection System for Dairy Products”, US Department of Agriculture, 2012-2016, \$500,000.
- > “Miniature Biosensor Unit for RNA detection of E coli”, US Army Corp of Engineers, 2012-2013, \$110,000.
- > “Nanomembrane-Based Nucleic Acid Sensing for Simultaneous Papillomavirus (HPV) HPV-induced microRNAs in Oropharyngeal Cancers”, Walther Cancer Institute, 2012-2014, \$200,000.
- > “Develop a Multi-target Sensor to Detect Dengue Serotypes from Infected Mosquitoes”, National Institute of Health, 2014-2017, \$418,000 (PI: S. Senapati)
- > “Next-Generation Diagnostic Devices for Genetically Modified Crops: Phase 1”, Far Eastern, 2015-2016, \$200,000.
- > “Dielectrophoretic Assembly of Carbon Nanotubes for Next Generation FET Chips”, IBM, 2015-2016, \$150,000 (+\$67,000 ND Matching).
- > “Development of a non-PCR RNA-Based Integrated Biosensing Platform for Detection of all four Dengue Virus Serotypes”, Naval Medical Research Center, 2016, \$66,000.

- > “A Solid State Nanopore miRNA Quantification Technology”, National Institute of Health, 2016-2019, \$600,000.
- > “An Integrated Microfluidics Platform for Rapid and Sensitive Exosome RNA Detection” , National Institute of Health, 2016-2018, \$425,000.
- > “Next-Generation Diagnostic Devices for Genetically Modified Crops: Phase 2”, Far Eastern, 2016-2018, \$600,000.
- > “Thermal Evaporation around Optically Excited Functionalized Nanoparticles”, National Science Foundation, 2017-2020, \$350,000 (PI: Tengfei Luo).
- > “The impact of Nanostructure Geometry on Photo-Thermal Evaporation Processes”CASIS (Center for the Advancement of Science in Space), 2017-2021,\$480,000 (PI: Tengfei Luo)
- > “SemiSynBio: CardiacMuscle-Cell-Based Coupled Oscillator Network”, 2018-2020, **\$1,125,000** NSF and \$375,000 SRC (PI: P Zorlutuna).
- > “miRNA-based Detection of Reperfusion Injury for Therapy Management in Myocardial Infarction”, National Institute of Health R01, 2018-2022, **\$1,942,000** (PI: Zorlutuna).
- > “An Automated High-Throughput Multiplexed Detection Platform for Real-Time Monitoring of Protein Fingerprints in Cell Media”,**Advanced Regenerative Manufacturing Institute**, 2019-2021, **\$1,443,442**.
- > “High Throughput Electrokinetic Fractionation and Analysis of Extracellular RNA Nanocarriers”, NIH **UG3/UH3** , 2019-2023, **\$2,815,500**.
- > “Highly Sensitive Multiplexed Nanocone Array for Point-of-Care Pan Cancer Screening”, National Science Foundation, 2019-2022, \$381,449 (PI: Tengfei Luo).
- > “Next-Generation Diagnostic Devices for Genetically Modified Crops: Phase 3”, Far Eastern, 2020-2022, \$450,000.
- > “A Transformative and Commercializable Platform Technology for Exosome Assay: Cancer Immunotherapy, Diagnostics and Biomarker Discovery”, Walter Cancer Foundation Cancer Cure Ventures, 2020-2022, \$200,000.
- > “Highly Sensitive Rapid Lateral Flow SARS-CoV-2 Antigen Test”, Advanced Diagnostics and Therapeutics Initiative, Notre Dame, 2020-2021, \$40,000.
- > “Receptor Cross-Talk in Early Metastatic Dissemination”, NIH, 2022-23, \$469,498 of **\$1,854,198** (PI: Sharon Stack).
- > “**RECODE**: Vascularization Differentiation and Morphogenesis Controlled with Hybrid Memristors”, NSF, 2022-26, **\$1,500,000** (PI: Donny Hanjaya Putra)
- > “A High-throughput Gel Droplet Organoid Drug Screening Platform”, NSF Center of Bioanalytic Metrology, 2022-2023, \$50,000.
- > “Reprogramming the Tumor Immune Microenvironment (TIME) against Cancer with Smart Combinatorial Therapeutic Exosomes”, inaugural Notre Dame Seed Transformative Interdisciplinary Research STIR, 2023-2024, \$100,000 (PI: Yichun Wang)

- > “A scalable continuous production platform for large-scale manufacturing of therapeutic exosomes”, NIH R21, 2023-2025, \$400,000 (PI: Yichun Wang)
- > “Development of a multi-pipette cell encapsulation platform for high-throughput drug screening”, Berthiaume Institute of Precision Health Equipment Grant, 2023-2025, \$75,000 (PI: Satyajyoti Senapati)
- > “A Novel Janus Bead Blood Assay for Point-of-Care Assessment of HCV Viral Load and Associated Liver Damage”, NIH-NIAID R21, 2024-2026, \$430,000.
- > “IMPACT: Immunoengineering Microgravity Platform for Accessible Cell-Based Therapies”, Notre Dame Bioengineering and Life Sciences Initiative, 2025-2027, **\$1,200,000**. (PI: Meenal Datta)
- > “Transform-L: Transforming Lymphatic Disease Management from Filariasis to Chronic Conditions”. ARPA-H, 2025-2028, **\$1,050,000**. (PI: Donny HanjayaPutra)

PhD Students Supervised (47 total, 18 academics in bold)

1 Vice-Chancellor, 1 Provost, 2 Deans, 4 Department Chairs and 2 Endowed Chairs

I.) University of California, Santa Barbara

M. Aluko, Ph.D., 1983, "Multiple-Time-Scale Analysis of Heterogeneous Catalytic Reaction Systems". Former chair of Chemical Engineering, Howard University, and **Vice-Chancellor (President), Federal University, Otuoke, Bayelsa State, Nigeria.**

A. Lahbabi, Ph.D., 1985, "Solution of Navier-Stokes Equation in Periodic Media". Retired **Professor at Ecole Nationale de L'Industrie, Morocco.**

II.) University of Houston

S.-H. Hwang, Ph.D., 1987, "Control of Nonlinear Systems - An Application of Dynamic Singularity Theory". Retired **Professor of Chemical Engineering at National Cheng Kung University, Taiwan.**

E. Boe, Ph.D., 1988, "The Dynamics and Control of Nonlinear Systems Possessing a Large Time Delay". Current position: Vice-President of Research at Pavilion.

J. Ratulowski, Ph.D., 1988, "Mathematical Modeling of the Mechanisms of Bubble Transport in Single Capillaries". Current position: Director of Flow Characterization, Schlumberger Well Service.

S.-M. F. Chiao, Ph.D., 1988, "Viscoelastic Flow in a Cylinder with a Rotating Lid - A Galerkin/Spectral Formulation". Retired **Professor of Chemical Engineering at Tung Hai University, Taiwan (retired).**

III.) University of Notre Dame

T. Prokopiou, Ph.D., 1992, "Nonlinear Waves on Liquid Interfaces". [Joint with M. J. McCready]. Current position: Owner of Gnomon consulting firm..

C. C. Chen, Ph.D., 1992, "Pattern Formation and Control". Current position: **Professor and Chair of Chemical Engineering at Chong-Cheng University, Taiwan.**

M. Cheng, Ph.D., 1994, "Sideband and Subharmonic Instabilities of Finite-Amplitude Monochromatic Waves". Current position: TCO FE Process Engineering Manager at Chevron Research.

S. Kalliadasis Ph.D., 1994, "Self-Similar Interfacial and Wetting Dynamics". Current position: **Professor of Fluid Mechanics, Chemical Engineering Department, Imperial College, England.**

M. Sangalli, Ph.D., 1995, [Joint with M. J. McCready], "A Study of Weakly Nonlinear Waves in Stratified Fluid-Fluid Flows and Distributed Reactors". Current position: Senior Research Engineer at UOP.

I. Veretennikov, Ph.D., 1997, "Experimental Study of Contact-Line Dynamics". Current position: Research Engineer, Bruker USA.

A. Indeikina, Ph.D., 1998, "Averaging over Multiple and Continuous Scales". Current Position: Mother and housewife.

R. Roberts, Ph.D., 1998, [Joint with M. J. McCready], "Interfacial Wave Behavior and Mass Transfer of Multi-Fluid Flows". Current position: Technology Development and Adoption Manager at Chevron.

Y. Ye, Ph.D., 1998, "Instabilities of Thin-Film Waves and Fronts". Current position: Process Engineering Manager at DuPont.

V. V. Yuzhakov, Ph.D., 1999, [Joint with A. E. Miller], "Electrochemical Self-Organization of Ordered Nanoscale Structures". Current position: Director of Process Engineering, Gilead Sciences. Developed A1C diagnostics at Bayer Diagnostics.

J. Keith, Ph.D., 2000 [Joint with D. T. Leighton], "Novel Reactor Design for Pollution Reduction". **Shaheen Awardee for best Notre Dame Engineering PhD.** Current position: **Senior Vice President and Provost of Iowa State, former Chair/Dean.**

D. Kopelevich Ph.D. 2002, "Transport in Nano-materials due to Thermal Noise and Deterministic Dynamics". Current position: **Associate Professor, Chemical Engineering, University of Florida (2007 NSF Career Awardee).**

S. Thamida, Ph. D. 2002, "Instability Mechanisms in Micro-Fluidics and Nano-Materials". Current position: **Department Chair and Professor, Chemical Engineering, India Institute of Technology, Tirupati.**

G. Arya, Ph. D. 2003 (joint with E. J. Maginn), "Molecular Simulation of Transport in Nanoporous Material", Current position: **Professor, Mechanical Engineering, Duke University.**

A. Minerick, Ph. D. 2003, "Medical Diagnostic Microfluidics and Physiological Blood Flow Dynamics", Current position: **Distinguished Professor and former Chair/Dean, Michigan Tech (2007 NSF Career Awardee), member of National Academy for the Advancement of Science.**

Y. Ben, PhD. 2004, "Nonlinear Electrokinetic Phenomena in MicroDevices", Current position: **Assistant Professor, Chinese Academy of Science, Beijing.**

R. Zhou, Ph. D. 2006, "Microfluidics of Micro- and Nano-Colloidal Suspensions: Designing Future Miniature Diagnostic Devices". Current position: Senior Manager, Western Digital.

P. Wang, Ph. D. 2007, "Electrokinetic Pumping and Spraying at Micro- and Nano-Scales". Current position: Lead Process Engineer, Chevron.

D. S. Hou, Ph. D., 2008, "Designing Microfluidic Components for Analyte Concentration and Identification Using AC Electrokinetics". Current position: Associate Director MMR Vaccine Manufacturing, Merck.

S. Maheshwari, Ph. D., 2008, "Anomalous Microfluidic Behavior Near Singular Interfaces". Current Position: Senior Financial Analyst, Amazon.

Zachary Gagnon, Ph. D., 2009, "Integrated AC Electrokinetics: Fundamental Design and Analysis for Portable Cellular and Molecular Diagnostics". **Shaheen Awardee for best Notre Dame Engineering PhD.** Current Position: **Associate Professor, Chemical Engineering, Texas A & M, (2014 NSF Career Awardee).**

Sagnik Basuray, Ph.D. 2011, "Dielectrophoresis and Its Application to Biomedical Diagnostic Platforms". **Shaheen Awardee for best Notre Dame Engineering PhD.** Current position: **Associate Professor, Chemical Engineering, New Jersey Institute of Technology. (2018 NSF Career Awardee)**

Xinguang Cheng, Ph. D. 2011, "Singular Harmonics near a Taylor cone". Current position: Analyst, Kemper Corp.

Nishant Chetwani, Ph. D. 2011, "AC Electrospray at Interfacial Singularities". Current position: Senior Technology Development Engineer, Intel.

Yunshan Wang, Ph. D. 2014, "Novel Optical Biosensors: Singular Intensity Amplification and Molecular Trapping Enhancement at Nanoscales". Current position: **Assistant Professor, Chemical Engineering, University of Utah.**

Daniel Taller, Ph.D. 2015 [joint with David Go], "Surface Acoustic Wave Microfluidics: Droplets, Pinned Liquid Films and Biodetection". Current position: Research Scientist, Livermore National Lab.

Yu Yan, PhD. 2015. "Non-Equilibrium Ion Transport in Nanofluidic Devices". Current position: Manager, Google.

Gongchen Sun. Ph.D. 2017. "Nonlinear Ionic Circuits and Ionic Memristors for Integrated Liquid Biopsy Chips", Current position: **Assistant Professor, Biomedical and Chemical Engineering, University of Texas at San Antonio.**

Steven Marczak, Ph.D. 2017. "Beyond Equilibrium: Using Ion Concentration Polarization to Enhance the Detection and Selectivity of Nucleic Acids and the Isolation of Exosomes", Current position: Project Manager, Defense Intelligence Agency.

Diya Li, Ph.D. 2019. “A CNT Switch for Identifying and Classifying Breast Cancer Tumor Cells in Plasma: Enhancing Selectivity of Molecular Assay with Nanoscale Hydrodynamic Shear”, Current position: Director of Strategy, Alcon.

Zehao Pan, Ph.D. 2019. “Focused Electric Field: Nanoscale Hotspot and Droplet Electrokinetics for High-Resolution Bioanalysis”, Current position: **Lead, Princeton-Inaedis Research.**

Sebastian Sensale, Ph.D. 2020. “DNA Kinetics and Resistive Signals in Nanopore Devices”, Current position: **Assistant Professor, Physics Department, Indiana University at Indianapolis.**

Chenguang Zhang, Ph. D. 2022. “Micro/Nanofluidics for Isolation and Quantification of Extracellular Nucleic Acids and Extracellular Vesicles”, Current Position: Senior Scientist, Sanofi Genetic Medicine.

Vivek Yadav, Ph.D. 2022 “Electrokinetically Driven Microfluidic Modules : Towards Evolution of Patterned Tissues”. Senior Engineer, Illumina.

Liao Chen, Ph.D. 2023 “Point-of-Need Pipette Droplet Microfluidics”. Senior Scientist, Elkem.

Kyle McCarthy, Ph.D. 2024 “Ion Exchange Membrane Biosensing of Extracellular Vesicles for Early Alzheimer’s Diagnosis”. **Post doc, Sandia National Lab.**

Sonu Kumar, Ph. D. 2024 “Characterization of Extracellular Nanocarriers Using Novel Biosensors for Diagnosis of Cancer, Cardiovascular and Alzheimer’s Disease”. Scientist, Spear Bio.

Current PhD Students

Tiger Shi (2026) (BS Chemical Engineering, Purdue University)

Daniel Montes Pinzon (2026) (BS Petroleum Engineering, National University of Columbia, Medellin) Joint with Donny Hanjaya-Putra

Alex Sinclair (2026) (BS Chemical Engineering, University of Delaware)

Feng Gao (2028) (BS & MS Polymer Science and Engineering, Sichuan University)

Postdocs and Senior Scientists Supervised (31 total, 19 academics in bold)

1 Associate Dean, 1 Department Chair and 2 Endowed Chairs

W. Q. Lu, 1984-1986, Current position: **Research Fellow, Institute of Mechanics, Chinese Academy of Science, Beijing. (Retired).**

L.-H. Chen, 1984-1990, Current position: **Professor, East China University of Chemical Technology, China. (Retired)**

Eugene Kalaidin, 1996-1999, Current position: **Professor and Chair, Department of Applied Mathematics, Kuban State University, Russia.**

P. Takhisotv, 2000-2002, Current position: **Associate Professor, Food Science Dept, Rutgers University.**

J. Wu, 2003-2004: Current position: **Professor, Electrical Engineering, University of Tennessee. (2005 NSF Career Awardee)**

E. A. Demekhin, 1994-2004. Current position: **Professor, Krasnodar University, Russia.**

D. Lastochkin, 2003-2005. Current position: Post-doc at University of Notre Dame.

L. Yeo, 2003-2005: Current position: **Distinguished Professor, Mechanical Engineering, Royal Melbourne Institute of Technology, Australia** (2007 Young Tall Poppy Award for Top Young Australian Academic).

Z. Chen, 2004-2007. Current position: **Luoja Chair Professor, Associate Dean, Pharmaceutical College, Wuhan University, China.**

S. Sengupta, 2005-2007 Current position: **Associate Professor, Bioengineering Department, University of Missouri, Columbia.**

G. Yossifon, 2007-2009. Current position: **Professor, Mechanical Engineering Department, Tel Aviv University, Israel.**

R. Kuczinski, 2009-2010. Current position: Research Engineer, Genentech

Ming Kwan Tan, 2010-2011. Current position: **Assistant Professor, Mechanical Engineering Swinburne University, Sarawak, Malaysia.**

Jenny Ho, 2010. Current position: Start-up, Singapore.

Z. Slouka, 2009-2011, 2012-2014. Current position: **Associate Professor, Chemical Engineering, Prague Institute of Technology, Czech Republic.**

Larry Li-Jing Cheng, 2010-2013 (Research Professor) Current position: **Associate Professor, Electrical Engineering, Oregon State.**

Shoupeng Liu, 2013-2014 (Postdoc) Current position: **Associate Fellow, Souzhou Institute of Biomedical Engineering and Technology, Chinese Academy of Science.**

Yongfan Men, 2014-16 (Postdoc) Current position: **Associate Professor, Shenzhen Institute of Advanced Technology, Chinese Academy of Science, Shenzhen, China.**

Jarrold Schiffbauer, 2016-17 (Postdoc) Current position: **Assistant Professor, Colorado Mesa**

Sunny Shah, 2010-2017 (Postdoc, Research Scientist) Current position: Project Manager, Endotronix.

Ze Yin, 2017-2019 (Postdoc) Current position: Senior Engineer, Quantum-Si.

Ceming Wang, 2015-2020 (Postdoc) Current position: Director of Engineering, Aopia Biosciences.

Zeinab Ramshani, 2016-2021 (Postdoc) Current position: Research Engineer, Mesoscale Diagnostics

Xiaoye Huo, 2019-2022 (Postdoc) Current position: **Associate Professor, Microelectronics Institute, Chinese Academy of Science, Beijing.**

Chenguang Zhang, 2022-2023 (Postdoc) Current position: Scientist, Sinofi Genetic Medicine Unit

Youwen Zhang, 2021-2023 (Postdoc) Current position: **Assistant Professor, Chemistry, Rutgers at Camden.**

Himani Sharma, 2019-2023 (Postdoc) Current position: Senior Scientist, Avery Digital Data.

Nalin Minaya, 2019-2023 (Postdoc) Current position: Scientist, Benebio.

Oles Dubrovski, 2022-2024 (Postdoc) Current position: Researcher, Institute of Nano and Microfluidics, Technische Universitat Darmstadt.

Ahmad Elsebahi, 2023-2024 (Postdoc) Current position: Researcher, University of Bergen

Current Postdocs, Senior Scientists and Research Professors

S. Senapati, 2007-Present (**Associate Research Professor**) (PhD National Chemical Laboratory, Pune, India)

Undergraduate Researchers

Name	Year	UG Institution	Topic	Placement
Tanto Hartono	1988-89	Notre Dame	Chaotic Dynamics of a Surge Tank	Caltech
Grace Su	1991-92	Michigan	Falling Film Wave Dynamics	UCLA
See-Eng Pham	1993-95	Cornell	Colloidal Rheology	Princeton
Abhishek Agarwal	1995-97	Purdue	Rivulet Dynamics	Wisconsin (EE)
Carolina Wu	1997-99	Notre Dame	Fractal Dewetting	Cornell
Kathy Wu	1998-99	Stanford	Corrosion Dynamics	Industry
Eric Sherer	1997-00	Caltech	Crystallization Patterns, Corrosion Fast Igniting Catalytic Converters	Purdue (Current Position: Assoc Prof, Louisiana Tech)
Alison Weltner	1999-01	Notre Dame	Physiological Dynamics of a Fish,	Industry
Justin Burt	2001-02	Notre Dame	Microfluidics for Diagnostic Kits	Texas
Kim Hatley	2004-05	Notre Dame	Biotissue for Drug Encapsulation	Industry
Andy Downard	2004-05	Notre Dame	Microfluidics and Tech Transfer	Caltech
Mike Coogan	2005-06	Notre Dame	Bacteria Detection	Industry
WenTao Luo	2005-06	Notre Dame	Microfluidics	Industry
Korey Chu	2005-08	Notre Dame	Microfluidics	Industry
Donny Hanjaya Putra	2006-07	Notre Dame	CNT Sensors	Hopkins (Current Position: Assist Prof, Notre Dame)
Andy Aijia	2007-08	Notre Dame	CNT Impedance	UCLA
Patrick Kuscik	2008-09	Notre Dame	Genetic Diagnostics	Med School
Peter Musheheimer	2008-10	Notre Dame	Nanoslot Electrokinetics	Wisconsin
Bryan Caufield	2008-09	Notre Dame	Genetic Diagnostics	Industry
Lauren Floccare	2008- 09	Notre Dame	Nanocolloid DEP	Industry
Yunshan Wang	2008	Peking Univ	Nanofabrication	Notre Dame (Current Position: Assist Prof, University of Utah)
Thomas Hagan	2009-10	Notre Dame	Nanocolloid Impedance	UC San Diego
Andrew Loza	2009-10	Notre Dame	RNA Sensing	Washington U. Med School
Andrew Chapouros	2009-11	Notre Dame	DNA Sensing	Industry
David Riehm	2009-11	Notre Dame	Solar Cells	Minnesota
Paul Scheel	2010-11	Notre Dame	Protein Sensing	Northwestern Medical Sch.
Truong Pham	2011-12	Notre Dame	Photoconductive Sensing	Minnesota
Christine Rustin	2011-12	Notre Dame	Nanoporous Membrane Sensor	Industry
Andrew Ayoob	2011-12	Notre Dame	Proteomic Mass Spectrometry	Harvard
Nick Rodriguez	2011-12	Notre Dame	Membrane Sensor	Northwestern
Dario Mazza	2012	Imperial	Photoconductive Sensing	Imperial College
Mark Sonderman	2012	Notre Dame	Membrane Sensor	Industry
Nicholas Schmeidler	2012	Notre Dame	Membrane Sensor	Industry
Sara Dale	2012	Notre Dame	Surface Acoustic Wave Mass Spect	Industry
Nicole McMillan	2012	Notre Dame	Membrane Sensor	Industry
Annie Shepherd	2013	Notre Dame	Membrane Sensor	Industry
Robin Lawler	2013	Notre Dame	Membrane Sensor	Georgia Tech
Chris Walker	2013	Notre Dame	Membrane Sensor	North Carolina State

Hongtan Du	2013	Peking Univ.	Nanofunnel Agglutination	Peking Univ
Didi She	2013	Peking Univ.	Si Cone Plasmonics	Univ of Penn
Bihan Zhu	2013	Notre Dame	Nanocone Array	Cornell
Karla Gonzalez	2013	Monterey Tec	AC Electrospinning	Notre Dame
Andrew Chang	2013	Chung Cheng	Integrated Chip	Post Doc
Katelin Hansen	2014	Notre Dame	Membrane Sensor	Industry
David Schipper	2014	Notre Dame	RT-PCR with Conductance Sensors	Industry
Yurui Qu	2014	Zhejiang Univ	Positive Gain Nanoparticles	Zhejiang University
Jia Chloe Gao	2014	Fudan	Membrane Sensors	UC Berkeley
Franklin Mejia	2014	Monterrey Tech	Upconversion Nanoparticles	Notre Dame
Rose Dorfler	2014-16	Notre Dame	Endotoxin Detection	Fulbright, Carnegie-Mellon
Paul O'Neil	2015	Dublin City U	3D Chip Fabrication	DCU
Flora Kleicmann	2015-16	Pazmony Catholic	miRNA Separation	Pazmony Catholic
Elaine Smith	2016-17	Notre Dame	Depletion nanoparticle assay	Industry
Olivia Frasher	2017-19	Notre Dame	membrane sensor	Rice
Ellen Cathill	2017	UC Dublin	transdermal microneedle array	UC Dublin
Miguel Joachim	2019-20	Notre Dame	protein membrane sensor	Notre Dame
Mary Chen	2020-23	Notre Dame	PDL1 Exosome Biomarkers	McGovern Med School
Grace Gasper	2020-22	Notre Dame	Supermere Biomarker	Baylor Medical School
Angela Wong	2020-now	Notre Dame	Droplet Digital PCR/Janus	Beghou Consulting
Angela Taglione	2023-now	Notre Dame	Lymphatic Capillary	Ohio State
Tyler Moorman	2024-now	Notre Dame	Supermere/EV Diagnostics	
Anjali Ramakrishnan	2024-now	Notre Dame	Supermere Diagnostics	

High School Interns

Name	Year	High School	Subject	College/Graduate School
Katherine Wu	1997	Lawrenceville	Corrosion	Stanford
Ashok Agarwal	1998-99	Elkhart	Wetting	Purdue (BS), Wisconsin (PhD)
Alex Cao	2012-13	Penn	PCR Chip	Notre Dame
Raymond Han	2012	Adams	Fuel Cells	UChicago (BS), MIT (PhD)
Simon Yan	2024	Gonzaga Prep	Exosome Production	Notre Dame (BS)

