Abbreviated CV Professor Hsueh-Chia Chang is known for his creative contributions across several disciplines (reaction engineering, control, fluid mechanics, soft materials, biosensing etc) and for his inventions of new diagnostic devices based on innovative integration of new phenomena from these different fields. His two books reflect his breadth and depth. His soliton interaction theory in dissipative/dispersive media (*Complex Wave Dynamics on Thin Films*, Elsevier, 2002) allowed the first understanding of how monochromatic waves lead to super-continuum chaos in a hydrodynamic instability. Yet, his second book is the first authoritative treatise on biochips based on electrokinetic modules (*Electrokinetically Driven Microfluidics and Nanofluidics*, Cambridge University Press, 2010). Although his work is fundamental, his inventions target specific applications in molecular diagnostics. His IPs have been licensed by three start-ups and are being commercialized. He wrote seminal reviews on different subjects, including two in the Annual Review of Fluid Mechanics and one in the Annual Review of Analytical Chemistry. He founded a cross-disciplinary journal, a new international conference series and the first tech transfer Center at Notre Dame.

Research outputs other than publications

- Editorial Responsibilities
  - Founding and Chief Editor – 2007-present: *Biomicrofluidics* (American Institute of Physics)

    Chang founded the first biology related journal for the prestigious American Institute of Physics journal lineup, which includes *Applied Physics Letters*, *Physics of Fluids*, *Journal of Chemical Physics*, *Journal of Mathematical Physics*, *Reviews of Scientific Instruments* and *Chaos*. He has since led the journal to become the highest ranked original research journal in terms of impact factor in the ISI Fluids & Plasma Physics category and the second highest ranked microfluidics journal. It is also the highest ranked AIP journal.
  - Associate Editor – 2000-2009: SIAM J of Applied Mathematics
- Talks in several disciplines:
  - 3 Named Lectures
    -Colburn Lectureship, University of Delaware, 1988.
    -James and Katherine Pattern Lectureship, University of Colorado, 1992.
    -Stanley Corrsin Hydrodynamics Lectureship, Johns Hopkins, 2002.

  - 6 plenary lectures
    - Chinese-Japan-Korea Symposium on Analytical Chemistry, Wuhan University, 2010.
    -Wave Phenomena IV, University of Alberta, 2010.
    - Electrokinetics Workshop, Technion, 2010.
    - Electrokinetics Workshop, Imperial College, 2010.
    - World Congress of Chinese Bioengineers, University of Singapore, 2015.
    - American Electrophoresis Society Annual Meeting, Salt Lake City, 2015.
  - More than 20 keynote lectures including
    - International Union of Theoretical and Applied Mechanics Symposia on Non-Parallel Flows (Potsdam, 1993), Nonlinear Waves (Hannover, 1994; Notre Dame, 1999), Nonlinear Singularities in Deformation and Flow (Haifa, 1997).
    - 13th International Congress of Chemical and Process Engineering CHISA'98, Prague, August 1998.
    - ACS Colloid and Interfacial Science Symposium, Columbia University, June 2009.
    - Foundations of NanoScience, Snowbird, Utah, April, 2014.
    - Advances in Microfluidics & Nanofluidics (Hong Kong; Singapore; Dalian; Notre Dame; Beijing, 2010-15)

  - More than 10 invited lectures including
    - Phoresis Workshop, Pohang, Korea, 2010
    - Electrokinetics Symposium, APS-DFD Annual Meeting, Baltimore, 2011.
    - Dielectrophoresis 2014, London, 2014.
    - Selectbio World Congress on Lab-on-a-Chip, Microfluidics and MicroArrays, 2015.

  - Over 100 invited seminars at various departments including
    -Chemical Engineering: MIT, 1991; Carnegie Mellon, Princeton, 1994, 2008; UCLA, 1997; Univ of Naples, 1998; Carnegie Mellon, 2003; Univ of Minnesota, 2003; Tsinghua, 2005; Caltech, 2007; U Penn, 2009.
    - Applied Math : Cornell, 1991; Levich, 1994; Princeton, 2000; NJIT, 2000; Penn State, 2002; Imperial College 2011; University of Illinois, Urbana, 2012.
    - Mechanical Engineering: Arizona State, 1997; MIT, 1998; UCLA, 1998; Brown, 2011; Stanford, 2012.
    - Bioengineering: Rice University, 2004; Missouri, 2004; UC Davis, 2007; UC San Diego, 2015.
    - Physics: Niel-Bohrs Institute, Copenhagen, 1995; University of Chicago, 1996; HKUST, 2009; Univ of Twente, 2011.
    - Chemistry: Fritz-Haber Marx-Planck Institute, Berlin, 1997.

- Awards and honours include
  - 1st Source Commercialization Award, Notre Dame, 2013
  - Distinguished Visiting Fellow Award, Royal Society of Engineering, UK, 2011
  - Bayer Corporation Endowed Chair, Notre Dame, 1998
  - Fellow of the American Physical Society, elected 1997
  - Francois N. Frenkiel Award, Fluid Dynamics Division of American Physical Society, 1991
  - Sigma Xi Outstanding Research Award, University of Notre Dame, 1990
  - Presidential Young Investigator Award, National Science Foundation, 1985
  - Regent's Junior Faculty Award, University of California, Santa Barbara, 1980
  - Wallace Memorial Honor Award, Princeton University, 1978

- Chang's work has been highlighted widely in the media, including *Physics News, The Economist, APS News, Medical Product Manufacturing, NBC, Rural TV, Chicago Sun Times, National Science Foundation Discovery*.
- Chang has received over $15 million in research funding from NSF, NIH, DoE, DoD, DTRA, NASA, etc.

Administrative Experience, Outreach and Service

- Chang was the Department Chair of Chemical and Biomolecular Engineering at Notre Dame from 1989 to 1995. He hired five faculty members as Chair, including the first woman to the Engineering College (Brennecke; NAE member) and a current endowed chair holder (Maginn). Research expenditure doubled during his tenure and the department ranking (17) was the highest ever.
- Chang has mentored over 45 PhD students and postdocs; 25 have landed academic positions at top universities such as Imperial, Johns Hopkins, Technion, Missouri, Florida, UC San Diego, etc in all 6 continents. They hold positions in Chemical, Mechanical, Biological and Electrical Engineering, as well as Chemistry and Applied Math. One is now the Vice Chancellor (President) of the Federal University in Nigeria, one holds a Professorship at Imperial, two hold endowed chair positions and one is the Dean of Engineering at Mississippi State. Industrial placement includes research labs at Google, Genentech, Bayer, Merck, Texaco, Chevron, Schlumberger etc.
- Chang mentored 6 junior faculty at Notre Dame: Maginn, Zhu, Go, Ardekani, Zartman and Peng. Four have won NSF Career Awards and two are women.
- Chang has collaborated with researchers from all fields in engineering, math and science over all 6 continents.
- Chang was on the Chemical Engineering Advisory Committee for Princeton and National Taiwan University, and the Mathematics advisory committee of Institut Teknologi Bundung, Indonesia. He was an adjunct Professor at Cheng Kung University from 2005-06 and at Tsinghua University, Taiwan, from 2010-14. He was a visiting Professor at Dept of Applied Math and Theoretical Physics at Cambridge University in 1993 and a UK Academy of Engineering Distinguished Visiting Fellow at Mathematics and Chemical Engineering, Imperial College, in 2011.
- Chang founded the Advanced Microfluidics and Nanofluidics conference series, which has been held at 5 locations in Asia and US, and will be in UK and Australia next. He organized one of them at Notre Dame in 2013 and also an IUTAM Symposium in 1999 (250 and 100 attendees each).

Technology Transfer

- Chang Founded the Center for Microfluidics and Medical Diagnostics in 2003 to initiate Tech Transfer at Notre Dame.
- Chang's work has resulted in 9 international patents, and 5 pending patents. Three startups have licensed his technologies and are currently developing them for commercialization. He serves as Chief Scientific Advisor of the largest, F Cubed LLC, which is 4 years old and employs a staff of 20.
- Chang collaborates extensively with large companies, including current projects with IBM and Far Eastern, and earlier ones with Schlumberger and Mobil.

Publications: Other than his two advanced treatises, evidence of the quality and diversity of Chang's research outputs can be found in the top journals that he publishes in, which span a number of fields (e.g., *Physical Review Letters*, *ACS Nano*, *Lab on a Chip*, *Advanced Materials*, *Analytical Chemistry*, *Small*, *Biosensors & Bioelectronics*, *Langmuir*, *Applied Physics Letters*, *Journal of Fluid Mechanics*, *Physics of Fluids*, *Soft Matter*, *SIAM J Applied Math* etc.) and also the large and still growing number of citations to his papers. PI Chang has a h-index of 56 and nearly 10,000 citations (Google Scholar) for his 260 publications. His publications appear in the following leading journals :

Fluid Mechanics: Phys Fluid (20 papers), JFM (15), PRL (12), PRE(12), JCIS (6), SIAM J App Math (3), Phil Trans Royal Soc (2), Annual Review of Fluid Mech (2); **Micro-Nanofluidic Diagnostics:** Biomicrofluidics (14), Electrophoresis (9). Lab Chip (7), Biosensors & Bioelectronics(2), Adv Materials (2), ACSNano (2), Small (2), Annual Review of Analytical Chem (1); **Reaction Engineering/Control :** Chem Eng Sci (25), AIChE J (10), JCP (7), JPC(3)