Curriculum Vitae

THOMAS THUNDAT
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DEMOGRAPHIC AND PERSONAL INFORMATION

Education and Training:

Ph. D., Physics, 1987, State University of New York at Albany
M. Sc., Physics (First Class), 1980, Indian Institute of Technology, Madras, India
B. Sc., Physics (major), Chemistry and Mathematics (minors), (First Class) 1978, University of Kerala, India
Post-doctoral (scanning probe microscopy): 1987-1990 Arizona State University

Current Appointments

2023 - present SUNY Distinguished Professor, Chemical and Biological Engineering, University at Buffalo, The State University of New York, Buffalo NY
2017 – present SUNY Empire Innovation Professor, Chemical and Biological Engineering, University at Buffalo, The State University of New York, Buffalo NY
2009 - present Distinguished Professor (honorary), Indian Institute of Technology, Madras

Past Professional Experience (in reverse chronological order):

2010 - 2017 Canada Excellence Research Chair (CERC) Professor, Department of Chemical Materials Engineering, University of Alberta, Alberta, Canada
2013 - 2016 Centenary Chair Professor, visiting, Indian Institute of Science, Bangalore, India
2012 - 2015 Fellow, National Institute of Nanotechnology (NRC, Canada)
2014 - 2016 Associate Director, India-Canada Center of Excellence (IC-IMPACTS)
2005 - 2010 UT-Battelle Corporate Fellow, Oak Ridge National Laboratory (ORNL)
2009 – 2010 Chair, ORNL Corporate Fellow Council
2002 - 2005 Distinguished Scientist, ORNL
1998 – 2002 Senior Scientist, ORNL
1998 - 2010 Group Leader, Nanoscale Science and Devices Group, ORNL
2001 - 2010 Research Professor/Joint Faculty, University of Tennessee, Knoxville, TN
1996 - 2010 Visiting Professor, University of Burgundy, Dijon, France
1992 - 1998 Research Staff Member, ORNL
1983 - 1984 Graduate Research Intern, Bell Labs, Murray Hill, NJ

Professional Society Fellowships:

Fellow, Institute of Electrical and Electronics Engineers (IEEE) (2021)
Fellow, American Institute for Medical and Biological Engineering (AIMBE) (2017)
Fellow, National Academy of Inventors (NAI) (2014)
Fellow, Society for Optics and Photonics Engineers (SPIE) (2012)
Fellow, American Society of Mechanical Engineers (ASME) (2010)
Fellow, Electrochemical Society (ECS) (2008)
Fellow, American Association for Advancement of Science (AAAS) (2006)

Fellow, American Physical Society (APS) (2002)

Honors and Awards:

2022 Distinguished Lecturer, IEEE Sensor Council
2019 Nano Energy Award, Beijing China
2013 State University of New York, Albany, Distinguished Alumni Award
2010 R&D100 Award (Mode Synthesizing AFM)
2010 Outstanding Achievement Award, ECS Sensor Division
2007 Nano 50 Award
2007 Southeastern Federal Laboratory Consortium (FLC) Award
2005 National FLC Award
2004 Jesse Beams Medal (Southeastern American Physical Society)
2004 Scientific American 50 Award
2004 Pioneer Awards, American Society of Mechanical Engineers (ASME)
2004 R&D 100 Award (explosive vapor sensor)
2004 National Federal Laboratory Consortium Award for technology transfer
2004 Distinguished Alumni Award, IIT Madras
2004 Life Sciences Division, Excellence in Research Award
2003 ORNL Inventor of the Year (Molecular comb)
2003 Southeastern Federal Laboratory Consortium Award
2003 Battelle Distinguished Inventor
2002 New York Kerala Center, Outstanding Accomplishments in Applied Sciences Award
2001 National Federal Laboratory Consortium Award
2000 Discover Magazine Award
2000 ORNL Inventor of the Year (cantilever sensors)
2000 UT - Battelle Technical Achievement Award for publication
2000 UT - Battelle Technical Achievement Award for Invention
1998 Lockheed Martin R&D Accomplishment Award
1997 AMSE Emerging Technology Award
1997 Lockheed Martin R&D Accomplishment Award
1997 Lockheed Martin Publication Award
1996 U.S. Department of Energy Young Scientist Award
1996 R&D 100 Award (Cantilever IR sensors and Hg sensors)
1996 Lockheed Martin Publication Award
1996 Lockheed Martin Inventor's Award
1995 Health & Safety Research Division Excellence in Research Award
1994 Martin-Marietta Energy Systems Significant Event Award
1982 Outstanding Teaching Assistant Award, State University of New York
1978 National Merit Scholarship (India)

RESEARCH ACTIVITIES

My research activities are focused on understanding and manipulating nanomechanical effects at interfaces and using that knowledge for the development of high-performance sensors, devices, and materials, for applications in health, environment, and energy. These interdisciplinary research efforts cover from basic research to design and development of complete systems. Multi-modal and multi-physics approaches are used for generating orthogonal data for high performance sensing. These approaches include molecular engineering of surfaces and interfaces, modulation of adsorbates with

optical, thermal, and electrical/electrochemical modulation, etc. To address the challenge of delivery electrical power to the sensors a new concept of transferring electrical power through a single wire has been developed. New concepts in energy conversion, storage, and transmission are pursued.

Significant Career Accomplishments:

- Developed new technique of tribotunnelling for energy harvesting (2017)
- Pioneered the development of single wire (single contact) electricity transmission concept (2010)
- Developed multi-physics sensor concepts of combining electrical, optical, and mechanical resonances (2000)
- Pioneered the development of a novel class of physical, chemical, and biological sensors based on adsorption-induced force (1991)
- Developed and patented micromechanical infrared detection, imaging technique including mechanical IR spectroscopy (1995)

U.S. Patents Awarded (44 Issued 5 pending):

1. Sean P Wagner and Thomas Thundat, Scalable and economic solid-state thermokinetic thruster, US patent 10767637 (2020).
2. S.S. Mziray, T. Thundat, and K. Cadien, Ultrasensitive high Q-factor AT cut quartz crystal microbalance femtogram mass sensor, US Patent 10,830,738 (2020)
3. Charles William Van Neste, Thomas George Thundat, John Errington Hawk, Richard Hull, Jonathan Backs, Nurichi Guseynov, Arindam Phani, Electrical energy transfer, US Patent 10622839 (2020)
4. V. Putkaradze, A. Phani, P. Kovur, T. Thundat, "Sensor including mechanical resonator with nanostructured surfaces", US Patent 10495607 (2019)
5. A. Passian, T.G. Thundat, and L. Tetard, "Mode synthesizing atomic force microscopy and mode-synthesizing sensing", US Patent #8,789,211 B2 (2014)
6. A. Passian, T.G. Thundat, and L. Tetard, "Mode synthesizing atomic force microscopy and mode-synthesizing sensing", US Patent #8,448,261 B2 (2013)
7. T.G. Thundat, L.R. Senesac and C. Van Neste, "Acoustic enhancement for photo detecting devices", U.S. Patent #8,378,286 B2 (2013)
8. T.G. Thundat, C. Van Neste, G. Brown and L. Senesac, "Photoacoustic microcantilever", U.S. Patent #8,194,246 B2 (2012)
9. T.G. Thundat, C.W. Van Neste and A.A. Vass, "External split field generator", U.S. Patent # 8,120,225 B2 (2012)
10. T.G. Thundat, T.L. Ferrell and G.M. Brown, "Photoelectrochemical molecular comb", U.S. Patent # 8,110,082 B2 (2012)
11. T.G. Thundat, C.W. Van Neste and A.A. Vass, "Internal split field generator", U.S. Patent # 8,089,188 (2012)
12. C.W. Van Neste, M.E. Morales-Rodriguez, L.R. Senesac and T.G. Thundat, "Standoff spectroscopy using a conditioned target", U.S. Patent # 8,080,796 (2011)
13. Y. Dechang, L.R. Senesac and T.G. Thundat, "Sensor for detecting and differentiating chemical analytes", U.S. Patent # 7,972,865 (2011)
14. C. Van Neste, L.R. Senesac and T.G. Thundat, "Photoacoustic point spectroscopy", U.S. Patent # 7,961,313 (2011)

15. T.G. Thundat, A. Passian and R.H. Farahi, “Microscale fluid transport using optically controlled Marangoni effect”, U.S. Patent # 7,939,811 (2011)
16. C. Van Neste, L.R. Senesac and T.G. Thundat, “Reverse photoacoustic standoff spectroscopy”, U.S. Patent # 7,924,423 (2011)
17. T.G. Thundat and G. M. Brown, “Electrochemical sensor having suspended element counter electrode and deflection method for current sensing”, U.S. Patent # 7,716,965 (2010)
18. M. Su, T.G. Thundat and D. Hedden, “Method and apparatus for remote sensing of molecular species at nanoscale utilizing a reverse photoacoustic effect”, U.S. Patent # 7,665,364 (2010)
19. V.I. Boiadjiev, G.M. Brown, L. Pinnaduwage, T.G. Thundat, P.V. Bonnesen and G. Goretzki, “Method for making gold thiolate and photochemically functionalizing microcantilevers”, U.S. Patent # 7,579,052 (2009)
20. T.G. Thundat and R.J. Warmack, “Surface wave chemical detector using optical radiation”, U.S. Patent # 7,243,548 (2007)
21. T.G. Thundat, T.L. Ferrell and G.M. Brown, “Photo-electrochemical molecular comb”, U.S. Patent # 7,211,181 (2007)
22. L.A. Pinnaduwage, T.G. Thundat, G.M. Brown, J.E. Hawk and V.I. Boiadjiev, “Chemically functionalized microcantilevers for detection of chemical, biological, and explosive material”, U.S. Patent # 7,207,206 (2007)
23. B.M. Evans, T.G. Thundat, R.D. Komistek, D.A. Dennis and M. Mahfouz, “In-vivo orthopedic implant diagnostic device for sensing load, wear, and infection”, U.S. Patent # 7,097,662 (2006)
24. T.G. Thundat, T.L. Ferrell and G.M. Brown, “Photo-electrochemical molecular comb”, U.S. Patent # 7,090,757 (2006)
25. J.W. Lee and T.G. Thundat, “Separation and counting of single molecules through nanofluidics, programmable electrophoresis, and nanoelectrode-gated tunneling and dielectric detection”, U.S. Patent # 7,033,476 (2006)
26. J.W. Lee and T.G. Thundat, “DNA and RNA sequencing by nanoscale reading through programmable electrophoresis and nanoelectrode-gated tunneling and dielectric detection”, U.S. Patent # 6,905,586 (2005)
27. T.L. Ferrell and T.G. Thundat, “Spectrometry and filtering with high rejection of stray light”, U.S. Patent # 6,831,747 (2004)
28. T.G. Thundat, T.L. Ferrell, K.M. Hansen, F. Tian, “High Throughput Microcantilever Detector”, U.S. Patent # 6,763,705 (2004)
29. M.J. Doktycz, C.L. Britton, S.F. Smith, P.I. Oden, W. Bryan, J.A. Moore, T.G. Thundat and R.J. Warmack, “Micro-machined calorimetric sensors”, U.S. Patent # 6,436,346 (2002)
30. T.G. Thundat and E.A. Wachter, “Piezoelectrically tunable resonance frequency beam utilizing a stress sensitive film”, U.S. Patent # 6,336,366 (2002)
31. J.K. Davis, T.G. Thundat and E.A. Wachter, “Magnetically tunable resonance frequency beam utilizing a stress-sensitive film”, U.S. Patent # 6,311,557 (2001)
32. T.G. Thundat, P.I. Oden, R.J. Warmack and E.L. Finot, “Micromechanical transient sensor for measuring viscosity and density”, U.S. Patent # 6,311,549 (2001)
33. T.G. Thundat, K.B. Jacobson, M.J. Doktycz, S. J. Kennel and R.J. Warmack, “Micromechanical antibody sensor”, U.S. Patent # 6,289,717 (2001)
34. T.G. Thundat, E.A. Wachter and J.K. Davis, “Electrostatically tunable resonance frequency beam utilizing a stress-sensitive film”, U.S. Patent # 6,263,736 (2001)

35. T.G. Thundat, “Uncoated microcantilevers as chemical sensors”, U.S. Patent # 6,212,939 (2001)
36. C.L. Britton, R.J. Warmack, W.L. Bryan, R. L. Jones, P.I. Oden and T.G. Thundat, “Capacitively readout multi-element sensor array with common-mode cancellation”, U. S. Patent # 6,167,748 (2001)
37. T.G. Thundat, R.J. Warmack and E.A. Wachter, “Electromagnetic and nuclear radiation detector using micromechanical sensors”, U.S. Patent # 6,118,124 (2000)
38. T.G. Thundat and M.J. Doktycz, "Micromechanical scanning differential calorimeter", U.S. Patent # 6,096,559 (2000)
39. T.G. Thundat, P.I. Oden and P.G. Datskos, “Non-contact passive temperature measuring system and method of operation using micro-mechanical sensors”, U.S. Patent # 6,050,722 (2000)
40. T.G. Thundat, "Micro-mechanical potentiometric sensors", U.S. Patent # 6,016,686 (2000)
41. T.G. Thundat and R.J. Warmack, “High resolution three-dimensional doping profiler”, U.S. Patent # 6,005,400 (1999)
42. T.G. Thundat, "Microcantilever detector for explosives”, U.S. Patent # 5,918,263 (1999)
43. T.G. Thundat, and E.A. Wachter, “Microcantilever sensor,” U.S. Patent # 5,719,324 (1998)
44. E.A. Wachter, and T.G. Thundat, “Microbar sensor,” U.S. Patent # 5,445,008 (1995)

PUBLICATIONS:
Total Peer Reviewed Journal Publications: 480

Web of Science - Refereed Journal Publications: 480
Web of Science Total Citations: ~ 21,355 **h-index**: 76 (web of science)
Google Scholar – Total Citations 36,440+, **h-index** 98, and **i-10 index** 461
https://scholar.google.com/citations?user=k2e1rR8AAAAJ&hl=en

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1. Y. Zhao, P. Charkarborty, A. Passian, and Thomas Thundat, “Ultrasensitive photothermal spectroscopy: Harnessing seebeck effect for atto-gram level detection”, NanoLetters (2023)
2. Z. Wu, Z. Wu, H. Lv, W. Zhang, Z. Liu, S. Zhang, E. Mu, H. Lin, Q. Zhang, D. Cui, T. Thundat, Z. Hu, “Nanophotonic catalytic combustion enlightens mod-infrared light source” Nano Research (2023).
3. Y. Zhao, P. Charkarborty, X. Meng, A. Nair, A. Goyal, and T. Thundat, “Molecular characterization of plastic waste using standoff photothermal spectroscopy”, ECS Sensor Plus, 2, 43401 (2023)
4. Y. Lam, D. Patel, A. Hoffman, T. Thundat, H.F. Ji, “Reaction-based microcantilever sensors”, ECS Sensor Plus, 2, 033401 (2023).
5. A. Kumar, K. Chen, T. Thundat, MT. Swihart, “Paper-based hydrogen sensors using ultrathin Pd nanowires”, ACS Appl. Mater. Interfaces, 15, 5439 (2023).

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6. Keren Jiang, Xuehai Tan, Wenyao Zhang, Shengli Zhai, Thomas Thundat, Zhi Li, “Localized anisotropic stress in the sodiation of antimony anode”, Nano Energy, 98, 107349
7. Abhishek Kumar, Thomas Thundat, Mark T Swihart, “Ultrathin palladium nanowires for fast and hysteresis-free H2 sensing”, ACS Appl. Nano Mat. 5, 5895-5905 (2022)

8. S. Zhang, Z. Wu, E. Mu, Y. Liu, Y. Lv, T. Thundat, Z. Hu, "Power generation on chips: Harvesting energy from the sun and cold space", Advanced Materials Technologies, 2200478 (2022)
9. K. Prashanthi and T. Thundat, "Nanowire sensors using an electrical resonance approach for vapor detection" Journal of the Electrochem. Soc., 169, 047502 (2022)
10. Yaoli Zhao, Patatri Chakraborty, Nicholas Stavinski, Luis Velarde, Vaishali Maheshkar, Karthik Dantu, Arindam Phani, Seonghwan Kim, Thomas Thundat, "Standoff and point detection of thin polymer layers using microcantilever photothermal spectroscopy", Journal of the Electrochemical Society, 169, 037501 (2022)
11. Kumar, Y. Zhao, M. M. Mohammadi, J. Liu, T. Thundat, and M.T. Swihart, "Palladium nanosheets-based dual gas sensors for sensitive room temperature hydrogen and carbon monoxide detection", ACS Sensors, (2022).
12. Abhishek Kumar, Yaoli Zhao, Shema Rachel Abraham, Thomas Thundat, Mark T Swihart, "Pd nanosheet inks for inkjet-printable H2 sensors on paper", Advanced Materials Interfaces 2200363 (2022)
13. S.A. Bukhari, R. McGee, M. Mahdavi, F. Bensebaa, L. Zhou, H-J Chung, T. Thundat, and A. Goswami, "Photoinduced multistable resonance frequency switching of phase change microstring at room temperature", Advanced Electronic Materials, 8, 2100819 (2022)

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14. A Hajesfandiari, V Sukhotskiy, A Alodhayb, F Khan, T Thundat, EP Furlani, "Microfluidic microcantilever as a sensitive platform to measure evaporation rate of picoliters of ethanol", Measurement, 173, 108617 (2021).
15. Y. Tian, L. Qian, Xiaojie Liu, A. Ghanekar, J. Liu, T. Thundat, G. Xiao, Y. Zheng, "High temperature and abrasion-resistant metal-insulator-metal metamaterials", Materials Today Energy, 21, 100725 (2021)
16. D. Zhang, T. Abraham, T. Dang-Vu, J. Xu, S. P Gumfekar, T. Thundat, "Optimal floc structure for effective dewatering of polymer treated oil sands tailings", Minerals Engineering, 160, 106688 (2021)
17. W-Y. Tsai, T. Thundat, and J. Nanda, "Towards a mechanically stable solid electrolyte interface", Matter, 4, 2119-22 (2021)
18. A. Kumar, M.M. Mohammadi, Y. Zhao, J. Liu, T. Thundat, and M.T. Swihart, "Reduced graphene oxide-wrapped Pd nanowires coated with a layer of zeolitic imidazolate framework-8 for hydrogen sensing", ACS Appl. Nano. Mat., (2021)
19. Abhishek Kumar, Mohammad Moein Mohammadi, Yaoli Zhao, Yang Liu, Jun Liu, Thomas Thundat, Mark T Swihart, "High-temperature and abrasion resistant metal-insulator metamaterials", Materials Today Energy 21, 100725 (2021)
20. A Hajesfandiari, V Sukhotskiy, A Alodhayb, F Khan, T Thundat, EP Furlani, "Microfluidic microcantilever as a sensitive platform to measure evaporation rate of picoliters of ethanol", Measurement, 173, 108617 (2021).
21. Y. Tian, L. Qian, Xiaojie Liu, A. Ghanekar, J. Liu, T. Thundat, G. Xiao, Y. Zheng, "High temperature and abrasion-resistant metal-insulator-metal metamaterials", Materials Today Energy, 21, 100725 (2021)
22. D. Zhang, T. Abraham, T. Dang-Vu, J. Xu, S. P Gumfekar, T. Thundat, "Optimal floc structure for effective dewatering of polymer treated oil sands tailings", Minerals Engineering, 160, 106688 (2021)

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23. Sheng-Joue Young, Yi Hsing Liu, Zheng Dong Lin, Kumkum Ahmed, MD Nahin Islam Shiblee, Sean Romanuik, Praveen Sekhar, Sandeep Arya, Rafiq Ahmad, Thomas Thundat, Larry Aiko Nagahara, Hidemitsu Furukawa, Ajit Khosla, "Miltiwalled carbon nanotube decorated with silver nanoparticles for acetone gas sensing at room temperature", J. Elect. Chem. Soc., 167, 167159 (2020)
24. Rosmi Abraham, Faheem Khan, Syed A Bukhari, Qingxia Liu, Thomas Thundat, Hyun-Joong Chung, Chun Il Kim, "Effect of surface and interfacial tension on the resonance frequency of microfluidic channel cantilever", Sensors 20, 6459 (2020).
25. Jungchul Lee, Faheem Khan, Thomas Thundat, Bong Jae Lee, "Microfluidic resonators with two parallel channels for independent sample loading and effective density tuning", Micro and Nano Systems Lett., 8, 1-7 (2020)
26. Sheng-Joue Young, Yi-Hsing Liu, MD Nahin Islam Shiblee, Kumkum Ahmed, Lin-Tzu Lai, Larry Nagahara, Thomas Thundat, Tsukasa Yoshida, Sandeep Arya, Hidemitsu Furukawa, Ajit Khosla, "Flexible ultraviolet photodetectors based on one-dimensional gallium-doped zinc oxide nanostructures", ACS Appl. Mat. Interfaces, 2, 3522-3529 (2020)
27. Syed A Bukhari, Sooraj Kumar, Pawan Kumar, Sarang P Gumfekar, Hyun-Joong Chung, Thomas Thundat, Ankur Goswami, "The effect of oxygen flow rate on metal-insulator transition characteristics of vanadium dioxide thin films by pulsed laser deposition", Appl. Surf. Science, 529, 146995 (2020)
28. Sai Kiran Oruganti, Ajit Khosla, Thomas Thundat, "Wireless power transmission for industrial internet of things: simulations and experiments", IEEE Access, 8, 187965 (2020).
29. Feng Hu, Lu An, Changning Li, Jun Liu, Guibin Ma, Yong Hu, Yulong Huang, Yuzi Liu, Thomas Thundat, Shenqiang Ren, "Transparent and flexible thermal insulation window material", Cell Reports Physical Sciences, 1, 100140 (2020).
30. Mohammad Moein Mohammadi, Abhishek Kumar, Jun Liu, Yang Liu, Thomas Thundat, Mark T Swihart, "Hydrogen sensing at room temperature using flamesynthesized palladium decorated crumpled reduced graphene oxide nanocomposites", ACS Sensors, 5, 2344-2350 (2020).
31. Kazi M Alam, Pawan Kumar, Sergey Gusarov, Alexander E Kobryn, Aarat P Kalra, Sheng Zeng, Ankur Goswami, Thomas Thundat, Karthik Shankar, "Synthesis and characterization of zinc phthalocyanine-cellulose nanocrystal conjugate towards highly functional CNCs", ACS Appl. Mat. Interfaces, 12, 43992-44006 (2020).
32. Ankur Goswami, Kazi M Alam, Pawan Kumar, Piyush Kar, Thomas Thundat, Karthik Shankar, "Mapping the surface potential, charge density and adhesion of cellulose nanocrystals using advanced scanning probe microscopy", Carbohydrate Polymers, 116393 (2020)
33. Nicholas Simin, Yangkyu Park, Dongkyu Lee, Thomas Thundat, Seonghwan Kim, "Enhanced nanoplasmonic heating in standoff sensing of explosive residues with infrared reflection-absorption spectroscopy", Optics Letters, 45, 2144-2147 (2020).
34. CW Van Neste, Thomas Thundat, Ajit Khosla, Sarah Szanton, Larry A Nagahara, "Perspective – Maintaining the quality of life in depopulating communities: Expanding smart sensing via a novel power supply", J. Electro. Chem. Soc., 167, 037564 (2020).
35. Kumkum Ahmed, MD Nahin Islam Shiblee, Ajit Khosla, Larry Nagahara, Thomas Thundat, Hidemitsu Furukawa, "Recent progress in 4D printing of gel materials", J. Electro. Chem. Soc., 167, 037563 (2020).

36. Sai Kiran Oruganti, Feifei Liu, Dipra Paul, Jun Liu, Jagannath Malik, Ke Feng, Haksun Kim, Yuming Liang, Thomas Thundat, Franklin Bien, "Experimental realization of Zenneck type wave-based non-radiative, non-coupled wireless power transmission", Sci. Reports, 10, 1-12 (2020).
37. K Prashanthi, T Thundat, "Nanowire sensors using electrical resonance", J. Electro. Chem. Soc., 167, 037538 (2020).
38. U. Thakur, P. Kumar, S. Gusarov, A. E Kobryn, S. Riddell, A. Goswami, K. Alam, S. Savela, P. Kar, T. Thundat, A. Meldrum, K. Shankar, "Consistently high Voc values in pin type perovskite solar cells using Ni2+ doped NiO nanomesh as hole transporting layer", ACS Applied Mat. Interfaces, 12, 11467-11478 (2020)

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39. A. Alodhayb, F. Khan, H. Etayash, T. Thundat, "Nanomechanical calorimetric spectroscopy using bi-material microfluidic cantilevers", J. Electrochem. Soc., 167, 37504 (2019)
40. S. Djokić, Ž. Antić, N. Djokić, T. Thundat, "Electroless deposition of Fe-Ni alloys from acidic and alkaline solutions using hypophosphate as reducing agent", J. Serbian Chem. Soc., 84, 1199 (2019)
41. J. Liu, Mohamad Ibrahim Cheikh, Rima Bao, Huihui Peng, Feifei Liu, Zhi Li, Keren Jiang, James Chen, Thomas Thundat, "Tribo-tunneling DC generator carbon aerogel/silicon multi-nanocontacts", Advanced electronic Materials, 5, 1900464 (2019)
42. A. Kumar, Ankur Goswami, Kirandeep Singh, Ryan McGee, Thomas Thundat, Davinder Kaur, "Magnetoelectric Coupling in Ni–Mn–In/PLZT Artificial Multiferroic Heterostructure and Its Application in Mid-IR Photothermal Modulation by External Magnetic Field", ACS Appl. Electro. Mat., 11, 2226 (2019)
43. J. Liu, Yaqian Zhang, James Chen, Rima Bao, Keren Jiang, Faheem Khan, Ankur Goswami, Zhi Li, Feifei Liu, Ke Feng, Jingli Luo, Thomas Thundat, "Separation and Quantum Tunneling of Photo-generated Carriers Using a Tribo-Induced Field", Matter, 1, 650 (2019)
44. J. Liu, Feifei Liu, Rima Bao, Keren Jiang, Faheem Khan, Zhi Li, Huihui Peng, James Chen, Abdullah Alodhayb, Thomas Thundat, "Scaled-up Direct-Current Generation in MoS_2 Multilayer-Based Moving Heterojunctions", 38, 35404 (2019)
45. R. McGee, Ankur Goswami, Syed Asad Manzoor Bukhari, Liang Zhou, Karthik Shankar, Thomas Thundat, "Fabrication of Phase Change Microstring Resonators via Top Down Lithographic Techniques: Incorporation of VO_2/TiO_2 Into Conventional Processes", J. Microelectromechanical Systems, 28, 766 (2019)
46. Y. Yoon, Thomas Thundat, Jungchul Lee, "Resonant hair humidity sensors for disposable applications: Revisit the hair hygrometer", Sensors & Actuators B-Chemical, 292, 1 (2019)
47. N. Debnath, Aloke Kumar, Thomas Thundat, Mohtada Sadrzadeh, "Investigating fouling at the pore-scale using a microfluidic membrane mimic filtration systems" Sci. Reports, 9, 1 (2019)
48. T. Abraham, Nhan Lam, Jonathan Xu, Dan Zhang, Harshita Wadhawan, Han Jun Kim, Michael Lee, Thomas Thundat, "Collapse of house-of-cards clay structures and corresponding tailings dewatering induced by alternating electric fields", Drying Technology, 37, 1053 (2019)
49. Z. Antić, Kovur Prashanthi, Dragana Jovanović, Thomas Thundat, Miroslav D Dramićanin, "Structure, morphology, and luminescent behavior of RE^{3+}-doped $GdVO_4$ thin films", Appl. Phys. A, 6, 410 (2019)

50. Y. Zhao, Yuting Hou, Jing Ji, Faheem Khan, Thomas Thundat, D Jed Harrison, "Sample preparation in centrifugal microfluidic discs for human serum metabolite analysis by surface assisted laser desorption/ionization mass spectrometry", Anal. Chem.,91, 7570 (2019)
51. J. Chen, Qiongyao Peng, Thomas Thundat, Hongbo Zeng, "Stretchable, Injectable and Self-Healing Conductive Hydrogel Enabled by Multiple Hydrogen Bonding toward Wearable Electronics", Chemistry of Materials, 31, 4553 (2019)
52. J. Chen, Jifang Liu, Thomas Thundat, Hongbo Zeng, "Polypyrrole-Doped Conductive Supramolecular Elastomer with Stretchability, Rapid Self-Healing, and Adhesive Property for Flexible Electronic Sensors., ACS Appl. Mat. Interfaces, 11, 18720 (2019)
53. K. Jiang, Faheem Khan, Javix Thomas, Parth Rakesh Desai, Arindam Phani, Siddhartha Das, Thomas Thundat, "Thermomechanical responses of microfluidic cantilever capture DNA melting and properties of DNA premelting states using picoliters of DNA solution", 114, 173703 (2019)
54. U.K Thakur, Sheng Zeng, Pawan Kumar, Sahil Patel, Ryan Kisslinger, Yun Zhang, Piyush Kar, Ankur Goswami, Thomas Thundat, Alkiviathes Meldrum, Karthik Shankar, "Nanophotonic enhancement and improved electron extraction in perovskite solar cells using near-horizontally aligned TiO2 nanorods", J. Power Sources, 417, 176 (2019)
55. Y. Yoon, Inseok Chae, Thomas Thundat, Jungchul Lee, "Polymer Microelectromechanical Systems: Hydrogel Microelectromechanical System (MEMS) Resonators: Beyond Cost-Effective Sensing Platform", Advanced Mat. Technologies., 4, 1970017 (2019)
56. J. Chen, Min Wu, Lu Gong, Jiawen Zhang, Bin Yan, Jifang Liu, Hao Zhang, Thomas Thundat, Hongbo Zeng, "Mechanistic Understanding and Nanomechanics of Multiple Hydrogen-Bonding Interactions in Aqueous Environment", J. Phy. Chem., 123, 4540 (2019)
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42. “Amorphous Diamond Films Synthesized by Pulsed Laser Ablation: Influence of Carbon Ion Kinetic Energy and Laser Wavelength,” D.H. Lowndes, V.I. Merkulov, A.A. Puretzky, D.B. Geohegan, G.E. Jellison, Jr., C.M. Rouleau, and T. Thundat, p. 325 *in* Advances in Laser Ablation of Materials (R.K. Singh, D.B. Chrisey, D.H. Lowndes, J. Narayan, E. Fogarassy, and T. Kawai, eds.), Material Research Society (MRS), Pennsylvania (1998).
43. “MEMS sensors and wireless telemetry for distributed systems”, C.L. Britton Jr., R.J. Warmack, S.F. Smith, P.I. Oden, G.M. Brown, W.L. Bryan, L.G. Clonts, M.G. Duncan, M.S. Emery, M.N. Ericson, Z. Hu, R.L. Jones, M.R. Moore, J.A. Moore, J.M. Rochelle, T.D. Threatt, T.G. Thundat, G.W. Turner and A.L. Wintenberg, Proc. SPIE, 3328, 112-123 (1998).
44. "*In-Situ* measurements of islanding and strain relaxation of Ge/Si(111)", P.W. Deelman, L.J. Schowalter, and T. Thundat, Mat. Res. Soc. Symp. Proc. 441 (1997).
45. “Ferromagnetic nanocomposite films from thermally labile nitride precursors”, L. Maya, M. Paranthaman, J.R. Thompson, T. Thundat and R.J. Stevenson, MRS Symposium Proceedings, 457, 213-218 (1997).
46. “Effect of strain relaxation mechanisms on the electrical properties of epitaxial CaF2/Si(111) heterostructures”, L.J. Schowalter, B.M. Kim, T.G. Thundat, C.A. Ventrice Jr. and V.P. LaBella, MRS Symposium Proceedings, 466, 21-26 (1997).
47. “Infrared imaging using microcantilevers”, P.I. Oden, P.G. Datskos, T. Thundat, E.A. Wachter, and R.J. Warmack, Micro-electromechanical systems (MEMS) ASME, 67 (1996).

48. "Temperature-dependent strain relaxation and islanding of Ge/Si(111)", P.W. Deelman, L.J. Schowalter, and T. Thundat MRS Symp. Proc. 399 (1996).
49. "Defects and their origin in thin films of (001) alkaline earth oxides", F.J. Walker, R.A. McKee, S.J. Pennycook and T.G. Thundat, MRS Symp. Proc., 401, 13-20 (1996).
50. "Gold nanocomposites prepared by reactive sputtering", L. Maya, M. Paranthaman, T. Thundat, W.R. Allen, A.L. Glover and J.C. Mabon, MRS Symp. Proc., 405, 529-534 (1996).
51. "Self-limiting growth kinetics of 3D coherent islands", K.M. Chen, D.E. Jesson, S.J. Pennycook, T. Thundat and R.J. Warmack, MRS Symp. Proc., 399, 271-281 (1996).
52. "Optical and infrared detection using microcantilevers", P.I. Oden, E.A. Wachter, P.G. Datskos, T.G. Thundat and R.J. Warmack, Proc. SPIE, 2744, 345-354 (1996).
53. "Temperature-dependent strain relaxation and islanding of Ge/Si(111)", P.W. Deelman, L.J. Schowalter and T. Thundat, MRS Symposium Proceedings, 417, 227-232 (1996).
54. "Piezoresistive microcantilever optimization for uncooled infrared detection technology", S. Rajic, B.M. Evans, P.G. Datskos, P.I. Oden, T. Thundat, and C.M. Egert, SPIE, 2817, 179 (1996).
55. "Ge Nanocrystals Grown On Si(111) By Molecular Beam Epitaxy With and Without CaF2 Buffer Layers", P.W. Deelman, T. Thundat, and L.J. Schowalter, Mat. Res. Soc. Symp. Proc. 358 (1995).
56. "Triangular step instability and 2D/3D transition during the growth of strained Ge films on Si(100), K.M. Chen, D.E. Hesson, S.J. Pennycook, M. Mostoller, T. Kaplan, T. Thundat and R.J. Warmack, MRS Symposium Proceedings, 379, 33-38 (1995).
57. "Morphology and microstructure of (111) crystalline CeO2 films grown on amorphous SiO2 substrates by pulsed-laser ablation", S. Zhu, D.H. Lowndes, J.D. Budai, T. Thundat, D.P. Norton and R.J. Warmack, MRS Symposium Proceedings, 354, 603-608 (1995).
58. "Mapping site-specific endonuclease binding to DNA by direct imaging with atomic force microscopy (AFM)", D.P. Allison, T.G. Thundat, P. Modrich, R.J. Isfort, M.J. Doktycz, P.S. Kerper and R.J. Warmack, Proc. SPIE, 2386, 24 (1995)
59. "Initiation and evolution of epitaxial growth of GaAs on CaF2/Si(111) substrates", W. Li, T. Anan, T. Thundat and L.J. Schowalter, MRS Symposium Proceedings, 317, 59-64 (1994).
60. "Scanning Tunneling Microscopic Imaging of Electrostatically Immobilized Nucleic Acids. The Influence of Self-Assembled Monolayered Structure on the Binding of Plasmid DNA to Gold Surfaces,"L.A. Bottomley, J.A. Jones, Y. Ding, D.P. Allison, T. Thundat, and R.J. Warmack, Proc. SPIE 1891, 48-55 (1993).
61. "Estimation of Surface Diffusion Length from AFM Images of Faceted GaAs Homoepitaxial Films", K. Yang, L.J. Schowalter, and T.G. Thundat, Mat. Res. Soc. Symp. Proc. Vol. 280, 143-46 (1993).

Book Chapters (partial list):

1. S. Kim, K. Kihm, and T. Thundat, "Microcantilever chemical and biological sensors", in *Encyclopedia of Nanotechnology*, edited by B. Bhushan, Springer (2012).
2. L. Norman, G. Thakur and T. Thundat, "Microcantilevers Sensors: Electrochemical Aspects and Biomedical Applications", in *Modern Aspects of Electrochemistry: Biomedical Applications Vol. 55"*, edited by S. S. Djokic, Springer (2012).
3. T. Thundat, C.W. Van Neste, L.R. Senesac and A.R. Krause, "Photothermal Sensing of Chemical Vapors Using Microcantilevers" in *Nanotechnology for Electronics, Photonics, and Renewable Energy,* pp 183-192. Edited by A. Korkin, P.S. Krstić and J.C. Wells, Springer (2010).

4. R. Datar, T.L. Ferrell, and T. Thundat, "Microcantilever Biomedical Sensors" in *Nanomedicine: Design of Particles, Sensors, Motors, Implants, Robots, & Devices,* pp313-323. Edited by Mark J. Schultz, Vesselin N. Shanov, and Yeo Heung Yun, Artec House (2009).
5. Z. Hu, D. Zhou, R. Greenberg and T. Thundat, "Electrochemical characterization of implantable high aspect ratio nanoparticle platinum electrodes for neural stimulations" in *Artificial Sight: Basic research, biomedical engineering, and clinical advances*, pp243-254. Edited by Mark S. Humayun, James D. Weiland, G. Chader and Elias Greenbaum, Springer (2008).
6. L. Senesac and T. Thundat, "Explosive detection using microcantilever sensors", in Counterterrorist Detection Techniques of Explosives", J. Yinon, ed., Elsever (2007).
7. Z. Hu, D.M. Zhou, R. Greenberg, and T. Thundat, "Electrochemical characterization of implantable high aspect ratio nanoparticle platinum electrodes", Artificial Sight, edited by M.S. Humayun, J.D. Weiland, G. Chader, E. Greenbaum, Springer (2007).
8. T. Thundat, "Explosive vapor detection using microcantilevers" Trace Chemical Sensing of Explosives, R.L. Woodfin, ed., Wiley–Interscience (2007).
9. A. Passian, A. L. Lereu, R. H. Farahi, T. L. Ferrell, and T. Thundat, "Thermoplasmonics in thin solid films", in Trends in Thin Solid Films Research, NOVA, ISBN 1-60021-455-X (2007).
10. T. Thundat, L. Pinnaduwage, and R. Lareau, "Explosive Vapor detection using Micromechanical sensors", in Electronic Noses & Sensors for the detection of Explosives, pp 249-266, J.W. Gardner and J. Yinon (eds.), Kluwer Academic Publishers (2004).
11. T. Thundat and A. Majumdar, "Microcantilevers for physical, chemical, biological sensing", *Sensors and Sensing in biology and engineering*, Barth, Humphry, Secomb (eds.) pp 338-355 SpringWein NewYork (2003).
12. T. Thundat, P.I. Oden, and R.J. Warmack,"Physical, Chemical, and Biological Detection Using microcantilevers", Molecular Nanotechnology, IBC Publications, Ed. Shelly Minton (1997).
13. T. Thundat, P.I. Oden, and R.J. Warmack, "Chemical, Physical, and Biological detection using microcantilevers", Microstructures and microfabricated systems III, P.J. Hesketh, G. Barna, and H.G. Hughes, Editors pp. 179-187, Electrochemical Society Vol. 97-5 (1997).
14. T.L. Ferrell, D.P. Allison, T. Thundat, and R.J. Warmack, "Scanning Tunneling Microscopy in Sequencing of DNA", Molecular Biology and Biotechnology: A Comprehensive Desk Reference, R. A. Meyers, ed., VCH Publishers, Inc., New York, p. 851-53 (1995).
15. D.P. Allison, T. Thundat, and R.J. Warmack, "Scanning Probe Microscopy in Genomic Research", Book Chapter: Automated Technologies for Genome Characterization, John Wiley & Sons, Inc. (1995).
16. S.M. Lindsay, T. Thundat, and L.A. Nagahara, "Imaging biopolymers under water by STM", in Biological and Artificial Intelligence Systems, pp 124-142 (Eds. E. Clementi and S. Chin) ESCOM, Leiden (1988).

EDUCATIONAL ACTIVITIES

Classroom instructions

• CE304 Chemical Engineering Thermodynamics (University at Buffalo)

The objectof this undergraduate course is to provide basic concepts in thermodynamics with applications in chemical engineering.

• CE418/518 Principles of Nanosensors (University at Buffalo)

This graduate/senior undergraduate course focuses on nanoscale science with applications in sensor design, fabrication, and applications.

• CHE694 Principles of Nanosensors (University of Alberta)

The objective of this graduate course is to introduce the concepts of nanoscale interaction of analytes and surfaces and molecular transport properties so as to design chemical and biological sensors.

• MATE694 Scanning Probe Microscopy (University of Alberta)

The objective of this graduate course was to introduce the basic instrumentation as well as the quantum theory involved in the scanning probe microscopy techniques such as STM, AFM, PFM, PSTM, and other variations.

• CME694 Nanoscience (University of Alberta)

The objective of this graduate course was to introduce the quantum mechanical and statistical methods used in sensor operations.

SERVICE

University

• UB Qualified Rank Committee
• Science Advisory Board member, Institute of Oil Sands Research (2013 - 2017)
• President, Engage India – Forum created by UofA President (2013 -2016)
• Associate Director, India-Canada Center of Excellence (IC-IMPACTS) (2014-16).
• Associate Director, Ingenuity Lab, Nanoaccelerator Program at the University of Alberta (2014-2016).
• Faculty Advisor, Inventors Forum, University of Alberta (2012-2015)
• IIT Madras – External Review Committee (2014)

Served as thesis committee member for over 100 PhD and MSc thesis (Canada and the US)
Served as external examiner for PhD thesis in Denmark, Australia, and India.

National Lab and Other National Entities:

• National Research Council (NRC) Committee on Human and Environmental Exposure - Science in the 21st Century (2010-2012)
• NIH-National Cancer Institute (NCI) Think Tank (2012, 2008)
• Chair, ORNL Corporate Fellow Council (2009 - 2010)
• Japan-US National Academies joint meeting delegate in Tokyo (2003)

Proposal review panel for NSF, NIH, NCI, DOE, ONR, etc.
Proposal reviewer for Canada, Ireland, The Netherlands, Denmark, Ireland, Belgium, Australia, and the UK

Editor/Editorial Boards:

• Associate Editor, Journal of Electrochemical Society (2019-)
• Associate Editor, Journal Solid State Science and Technology (2019-)
• Associate Editor, Sensor Plus, JES (2022 -)
• Associate Editorial, Microscale Thermophysical Engineering Journal (2004 -)
• Editorial Board, Nature Scientific Reports (2012-2017)
• Editorial Board, Journal of Nanotechnology (2008-2015)
• Editorial Board, Scanning (2010-2016)
• Editorial Board, Review of Sci. Instruments (2005-2008)

Industry
• Protein Discovery, Inc. Science Advisory Board (2003 – 2008)
• FemtoGen, Inc., Science Advisory Board (2003 - 2007)
• Kalinex, Inc. Science Advisory Board (2005 -2010)
• Protiveris Science Advisory Board (1998 - 2005)
• ORNL Inventors Forum Council member (1996 - 1998)

Professional Societies - Conference Track Organizer (Last 10 years):

- ECS Prime, Honolulu, Hawaii (2024)
- IEEE APSCON Conference, Bangalore (2023)
- ECS Symposium Co-Organizer, Orlando, Fl (2021)
- IMCS Conference, C-Organizer, Chicago, Il (2021)
- Track Organizer, IEEE Sensor Conference, Rotterdam (2020)
- Track Organizer, IEEE Sensor Conference, Montreal (2019)
- Co-Organizer, MRS Fall Symposium, Boston (2015)
- Co-Organizer MRS Fall Symposium, Boston (2014)
- Co-Organizer, SPIE Defense and Security Conference, Baltimore (2013)
- Co-Organizer, MRS Spring Meeting, San Francisco, (2012)
- Co-Organizer, SPIE Defense and Security Conference, Baltimore (2012)
- Co-Organizer, Sixth International Nanomechanics Workshop, Bombay, India (2012)
- Co-Organizer, ECS Meeting Symposium, Montreal, Canada, (2011).
- Co-Organizer, MRS Fall Meeting Symposium, Boston, MA, (2010)
- Co-Organizer, APS March meeting, Division of Biological Physics Symposium, Portland, OR, (2010).
- Co-Organizer, Fifth International Nanomechanics Workshop, Banff, Canada, (2010).
- Track Organizer, ASME NEMBIB 2009, Huston, TX, (2010).
- Organizer, Fifth International Conference on Nanomechanical Cantilever Sensors, Jeju Island, S. Korea, (2009).
- Co-Organizer, ECS Meeting, San Francisco, CA, (2009).
- Co-Organizer, ICMEMS – IIT Madras, India, (2009).
- Co-Organizer, MRS Fall Conference, Symposium on Biomedical Nanotechnology, Boston, MA, (2008).
- Co-Organizer, Fourth International Conference on Nanomechanics, Max Plank Institute, Mainz, Germany, (2008)
- Co-Organizer, Third ASME Nanomechanics Workshop, Denmark, (2006).
- Co-Organizer, MRS Symposium on Nanosensors, Boston, MA, (2006).
- Co-Organizer, Second ASME Nanomechanics Workshop, Knoxville, TN, (2005).
- Organizer and symposium chair, Nanomechanical Sensor Symposium, APS Meeting, Los Angeles, CA, (2005).
- Co-Organizer, Microcantilever Sensor Symposium, ECS Fall Meeting, Los Angeles, CA, (2005).

INVITED TALKS:
(Plenary, and Keynote, and Invited Talks that I have personally given) (2000 -2020):

1. "Delivering electrical power to distributed MEMS sensors for battery-free operation, Macquarie University in Australia", IEEE Distinguished Lecture (Sept. 2022)
2. "Chemical selectivity in MEMS sensors", IEEE Distinguished Lecture, Prince Songkia University in Thailand, (Feb. 13, 2023)
3. "Standoff chemical sensing", IEEE Distinguished Lecture, Prince Songkia University in Thailand, (Feb. 27, 2023)
4. "Photothermal effects and MEMS Sensors", Invited talk IEEE Electron Devices (July, 2022)
5. "Photothermal Spectroscopy", Plenary Talk, Annual Fitzpatrick Institute for Photonics Symposium (March 2022)
6. "MEMS sensors", Wuhan University Department of Mechanical Engineering Seminar (April 2022)
7. "Sensors and Sustainability", Plenary talk, 1St International Conference on Technologies for Smart Green Connected Societies (ICTSG) (Nov. 2021)
8. "Chemical Selectivity Challenges", IEEE Sensors 2021 (Oct. 2021)
9. "Selectivity and Reproducibility Challenges in Micromechanical Sensors", Plenary talk, International Conference on Nanomechanical Sensors, Calgary, Canada (June 2021)
10. "High Performance Sensors for Health and Safety", Workshop on Use of Nano Sensing for Healthcare and Wellness, Tata Consultancy Services (TCS), Bombay, India (June 2021).
11. "Quo Vadis, MEMS Chemical Sensors?", 5th International conference on Emerging Electronics (IEEE-ICEE 2020), IIT Delhi (Nov. 2020).
12. "Chemical Selectivity in MEMS Sensors", KAIST International Workshop on Micro-Nano Technology for Precision Sensing (Dec. 2020)
13. "MEMS sensors for water quality monitoring", Emerging Frontiers in Clean water, IIT Madras (June 2020)
14. "Nanomechanical Sensors", International Conference on Recent Advances in Nanoscience and Nanotechnology, Madras, India (December 2019)
15. "Quantum sensors", Chemistry Department, IIT Madras (Dec. 219)
16. "Nanomechanics and Chemical Sensors", International Conference on Nanotechnology, Farrok College, Calicut India (December 2019)
17. "Chemical Selectivity in MEMS and NEMS" International Conference on Nanoscience, Stella Maris College, Chennai, India (Dec. 2019)
18. "Quantum Materials", International Workshop on Quantum Science, Sacred Heart College, Cochin India (Dec. 2019)
19. "Nanocalorimertic chemical sensors", MRS Fall meeting (December 2019)
20. "Nanomechanical sensors" IISc Bangalore, IUSSTF Workshop (March 2019).
21. "Chemical Selectivity in MEMS and NEMS" University of Missouri, Columbia (Sept. 2018)
22. "4D printing for sensors and energy applications" Plenary Talk, 1st International conference on 4D materials and Systems, Electro Chemical Society, Yamagata, Japan (Aug. 2018)
23. "Nanomechanical biosensors", IEEE Summer Workshop, IISc Bangalore (June 2018)
24. "Nano-biosensors" International Conference on Nanomechanics, Seoul, S. Korea (Aug. 2018)

25. “Triboelectric tunnel current generation” J. Liu and T. Thundat, MRS Spring Meeting, Phoenix, AZ (April, 2018)
26. “Single wire electric power transmission”, Cochin University, India (Jan. 2018)
27. “Nanomechanical Sensors” M.G. University, India (Jan. 2018)
28. “Nanosensors for personalized medicine”, International Conference on Nanomedicine, (Dec. 2017)
29. “Nanosensors” University of Waterloo, Canada (Oct. 2017)
30. “Photothermal chemical selectivity”, MRS Fall Meeting, Boston (Dec. 2016)
31. “Tesla’s Dream: Single Wire Electricity Transmission”, Yamagata University, Japan (Nov. 2016).
32. “Chemical Selectivity” Keynote talk, ECS Prime, Honolulu, Hawaii (Oct. 2016)
33. “Strides towards chemical selectivity”, International Workshop on Nanomechanics, Delft, The Netherlands, June 2016.
34. “Wire-free electricity transmission”, Delft University, 2016
35. “Tesla’s Dream Revisited”, Center for Nanophase Material Science, ORNL (2016)
36. “Chemical selectivity in MEMS sensors”, Cochin Nano, India (2016)
37. “Defect Engineering” Technical University Denmark, Copenhagen (2016)
38. “Story of a Cantilever: Nanomechanics at Interfaces” Distinguished Speaker Series, York University, Toronto (2015)
39. “Nanowire Calorimetry for Chemical sensing”, International Conference on MicroNanotechnology, Shanghai, China (2015)
40. “MEMS and NEMS for Molecular Recognition”, International Workshop on Nanotechnology, Kookmin University, Seoul (2015)
41. “Nanomechanical Systems: From Molecular Recognition to Energy Conversion” Plenary Talk, International Conference on Nanotechnology, Calgary (2015)
42. “Colloids in Confined Spaces”, Key Note address, International Conference on Colloids and Interfaces, Mainz, Germany (2015).
43. “Photothermal and photoacoustic spectroscopy” Invited talk, International Conference on Optical Properties of Materials, Montenegro, (2015).
44. “Mechanical Photothermal Spectroscopy”, University of Central Florida, Nanoscience Center, Jan. 2015.
45. “Chemical sensing through Calorimetry”, Texas Tech. University, Department of Chemical Engineering, June 2015.
46. “Nanomechanical Sensors” Invited talk, Biotronics 2014 international conference, Seoul, Korea, Sept. 2014.
47. “Nanoburning of Methanol”, Plenary Talk, International Conference on Nanoenergy Conference, Beijing, Dc. 2014.
48. “Single wire electricity transmission”, Shanghai Jiatong University, Department of Micro Nano Electronics, Shanghai (Dec. 2014).
49. “Sustained Electrical Power from Catalytic Burning of Methanol”, Shanghai University, Department of Physics (Dec. 2014).
50. “Reviving Tesla for an array of possibilities”, Leadership Lecture Series IIT Madras, May 2014
51. “Single wire power transmission”, IEEE Seminar, IIT Bombay, May 2014
52. “Calorimetric Cantilever Sensors”, Physics Department, IIT Madras, May 2014

53. “Nanomechanical sensors for biomedical applications”, Amrita Institute, Center for Nanoscience, Cochin, May 2014
54. “Phototermal Nanomechanical Spectroscopy”, NMC 2014 Madrid May 2014.
55. “Nanothermal Sensors”, Center for Nanoscience, IISc Bangalore, December 2013.
56. “Thermomechanical Sensors”, International Conference of Solid State Physics, New Delhi, December 2013
57. “Tip-induced nanolithography”, SPIE Conference, Baltimore, April 2013.
58. “Standoff and point sensing using MEMS”, Keynote talk, International Conference on Emerging Electronics, IIT Bombay, December 2012.
59. “Micromechanical Sensors”, Invited Tutorial, International Conference on Emerging Electronics, IIT Bombay, December, 2012.
60. “Subs-surface imaging in scanning probe microscopy”, Cochin University, India, Dec. 2012
61. “Photothermal Spectroscopy and Microscopy”, MRS Fall Meeting, Boston, 2012
62. Nanosensors, Public Lecture, University of Alberta, Oct., 2012
63. “Controlling fluid flow at microscale: Applications in sensing and biofilms”, Plenary Talk ASME conference, San Juan, Puerto Rico, July 2012.
64. “Micro and Nanomechanics and Molecular detection’, IIT Bombay Invited Tutorial, International Nanomechanics Workshop, Bombay, India, June 2012.
65. “Photothermal Spectroscopy”, International Scanning Probe Microscopy Conference, Toronto, June 2012
66. “Micromechanical Sensing”, Physics Department Colloquium, University of Alberta, Jan. 2012
67. “Cantilever Sensors”, Technical University Denmark, Christmas Symposium 2011.
68. “Photothermal Cantilever Deflection Spectroscopy”, Cochin University, India 2011
69. “Optically Directed Transport and Detection of Biomolecules”, City College Dublin, Ireland (2011)
70. “Frizzy Hair, Nanomechanics, and Oil Sands, Tech Fest, IIT Bombay, 2011
71. “Molecular Recognition in Cantilevers” POSTECH, S. Korea, 2011
72. “Nanomechanical Sensors” National Academies Panel on Chemical and Biological Sensors, Washington, DC, (2010).
73. “Standoff Detection of Explosives”, ACS Pacific Rim Conference, Hawaii, 2010
74. “Cantilever sensors” Keynote Address, ICONSAT, Indian Institute of Technology (IIT), Bombay, India, (2010).
75. “Molecular Speciation” IIT, Department of Physics Colloquium, Madras, India, (2010).
76. “Scanning probe microscopy and sub-surface imaging” Institute of Mathematical Sciences, Madras, India, (2010).
77. “Standoff and point detection”, IIT, Department of Electrical Engineering, Madras, India (2010).
78. “Nanomechanical Systems”, Columbia University, Dept. of Mechanical Engineering, NYC, (2009).
79. “MEMS and Molecular Recognition”, Stevens Institute of Technology, Nanotechnology Institute, NJ, (2009).
80. “Cantilever-Based Biosensors”, University of Miami, FL, (2009).
81. “Microcantilever Sensors”, NEMS Workshop, California Institute of Technology, Pasadena, CA, (2009).

82. “Thermomechanical Systems”, Plenary Talk, NanoGiga Conference, McMaster University, Hamilton, ON, (2009).
83. “Nanomechanical Sensing: Challenges and Opportunities”, National Nanotechnology Initiative, Washington, D.C., (2009).
84. “MEMS and NEMS” Electrical Engineering Department, Pennsylvania State University, (2009).
85. “Chemical sensing using cantilever sensors” Chemistry Department, Drexel University, Philadelphia, PA, (2009).
86. “Nanomechanical Sensing”, Mechanical Engineering Department, Vanderbilt University, Nashville, TN, (2009).
87. “Strategies for Molecular Recognition in MEMS”, Keynote Address, ICMEMS, IIT Madras, Chennai, India, (2009).
88. “Molecular Recognition in MEMS Sensors”, IIT Bombay, India, (2009).
89. “Nanoengineering Applications”, Rajagiri School of Engineering, Cochin, India, (2009).
90. “Nanotechnology for Biomass Conversion”, Botany Department, St. Theresa’s College, Cochin, India, (2009).
91. Molecular Recognition in MEMS, University of Arkansas, Fayetteville, AR, (2008).
92. Nanomechanical Sensing”, Mechanical Engineering Dept., Virginia Tech, Blacksburg, VA, (2008).
93. “Receptor-free biosensing”, APS March Meeting, New Orleans, LA, (2008).
94. “Detection of IEDs”, IED Detection Conference, Washington, D.C., (2008).
95. “Microcantilever Sensors”, State University of New York Albany, NY, (2008)
96. “Integrated Nanomechanical Sensors”, General Electric Company, Schenectady, NY
97. “Receptor-free mechanical sensing”, Institute of Electrical and Electronics Engineers (IEEE) Sensor Conference, Atlanta, GA, (2007).
98. MEMS Sensors, Chemical Engineering Dept., Vanderbilt University, Nashville, TN (2007).
99. Chemical and biological sensing using cantilevers, Photonic West, San Jose, CA, (2007).
100. “Chemical and Biological Detection Using Cantilever Sensors”, Pittcon Meeting, Chicago, IL, (2007).
101. Receptor-free sensing, SPIE Conference, Orlando, FL, (2007).
102. Receptor-free detection of chemicals, International Conference on Cantilever Sensors, Montreal, Canada, (2007).
103. Explosive Detection using Cantilever Sensors, US Army, ARDEC, Detroit, MI, (2006).
104. Microcantilever sensors, Material Research Society Conference Tutorial, Boston, MA, (2006).
105. Nanomechanical sensors, MRS Conference, Boston, MA, (2006).
106. Molecular recognition in MEMS sensors, Technical University, Denmark, (2006).
107. Cantilever Sensors, Max Plank Institute, Mainz, Germany, (2006).
108. Photothermal Spectroscopy, University of Burgundy, France, (2006).
109. Nanomechanical Sensors, International conference on scanning probe microscopy, Montepellier, France, (2006).
110. Selective and sensitive detection of analytes using MEMS, CEA, France (2006).
111. Cantilever Arrays, International Conference on Nanomechanics, Denmark, (2006).
112. Mechanical Sensors, Texas Tech University, Lubbock, TX, (2006).

113. Microcantilever Sensor Arrays, Sandia National Laboratory, Albuquerque, NM, (2006).
114. Explosive vapor sensing, DHS-DOE Workshop on Explosives, Albuquerque, NM, (2006).
115. MEMS Environmental Sensors, Workshop on Nanotechnology for EPA Applications, Raleigh-Durham, NC, (2006).
116. "Explosive vapor detection using cantilever sensors", American Chemical Society Meeting, Washington, D.C., (2005).
117. "Nanomechanical Sensor Arrays for Multiplexed detection of Chemicals", Weissberger/Williams Lecture, Eastman Kodak Company, Rochester, NY, (2005).
118. "Nanomechanical Sensors", National Academies (USA) Japan-US Workshop on sensors, Tsukuba, Japan, (2005).
119. "Cantilever Sensor Arrays for chemical sensing", Academia Sinica, Taiwan, (2005).
120. "Microcantilever Biosensors", Institute of Physics, Academia Sinica, Taiwan, (2005).
121. "Molecular recognition using MEMS arrays", ITRI, Taiwan, (2005).
122. "Nanobiology and Nanomechanics", Molecular Biology Department, University of Tennessee, Knoxville, TN, (2004).
123. "Nanomechanics", IIT, Madras, India, (2004).
124. "MEMS sensors", American Physical Society, March Meeting, Montreal, Canada, 2004).
125. "Molecular recognition using nanomechanics", ASME Workshop on Nanotechnology, Reno, NV, (2004)
126. "MEMS-based explosive detectors", ATF-DHS Workshop, Scottsdale, AZ, (2004).
127. "Microcantilevers and molecular recognition", MRS Spring Meeting, San Francisco, CA (2004).
128. "Frictional effects in MEMS", DOE Workshop on Friction, Oak Ridge National Laboratory, TN, (2004).
129. "Cantilevered MEMS sensors", Council for the Advancement of Science Writing (CASW) New Horizons in Science Briefing, Knoxville, TN, (2003).
130. "Explosive vapor detection using nanomechanics", NATO Advanced Studies Workshop, England, (2003).
131. "Micromechanical detection of chemical and biological warfare agents", Biodefense Conference, Washington, D.C., (2003).
132. "Cantilever array sensors", Protiveris Inc., Bethesda, MD, (2003).
133. "Molecular recognition using mechanical sensors", Rutgers University, NJ, (2003).
134. "Micromechanical sensors", Auburn University, Auburn, AB, (2003).
135. "Physical, chemical, and biological detection using cantilevers", Pittcon Meeting, Orlando, FL (2003).
136. "Environmental sensing using mechanical sensors', American Chemical Society, New Orleans, LA, (2003).
137. "MEMS and NEMS Sensors", Northwestern University, Evanston, IL, (2003)
138. "Detection of Terrorist weapons using microcantilever sensors", Lawrence Livermore National Laboratory, Livermore, CA, (2002).
139. "Mechanical Sensing", State University of New York Albany, NY, (2002).
140. "Microcantilever gas sensors", DARPA Workshop on Microsensors, Monterey, CA, (2002).

141. “Micromechanical Sensors”, Nanotechnology Conference, Georgia Institute of Technology, Atlanta, GA, (2002).
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