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(a) Professional Preparation

- 1. Indian Institute of Science, India, Ph.D., *Batteries and Fuel Cells*, 1990**
 - (a) Scored First class with distinction
 - (b) Developed bifunctional oxygen electrodes for metal/air cells and active carbon based electrodes with Pt-Ru electrocatalyst for alkaline fuel cells
- 2. Madurai Kamaraj University, India, M.S., *Chemistry*, 1985**
 - (a) Scored First class with distinction
 - (b) Obtained University Second Rank
- 3. Madras University, India, M.B.A., *Statistical Process Control*, 1999**
 - (a) Scored First class with distinction
 - (b) Carried out an industrial project on the optimization of lead acid battery manufacturing process using statistical techniques
- 4. Madurai Kamaraj University, India, B.S., *Chemistry*, 1983**
 - (a) Scored First class with distinction

(b) Professional Experience

- 1. Professor, ASU-Polytechnic - May 2014**
Graduate Program Chair – MS in Clean Energy Systems
Principal Scientist, ZEVX (www.ZEVX.com)
- 2. Associate Professor, ASU-Polytechnic, Tenured May - 2009**
Associate Professor, ASU-Polytechnic, Tenure track - August 2005
Graduate Faculty, "Materials Science and Engineering", ASU-Tempe
 - (a) Established a Fuel Cell Research Laboratory
 - (b) Established an Alternative Energy Technology (ALT) program for BS and MS degrees
 - (c) Designed and developed 400 and 500 level courses on Batteries, Fuel Cells and Solar Cells
 - (d) Conducting Research and teaching courses on Batteries, Fuel Cells and Solar Cells
- 3. Technical Advisor, Hoku Scientific Inc., Honolulu, July 2005 to June 2006**
 - (e) Development of MEAs using non-Nafion based membranes and mass production of MEAs for PEMFC for Automotive applications.

- (f) Preparing detailed research reports for use in research activities and to support patent procedures.
- 4. **Chief Scientist**, Hoku Scientific Inc., Honolulu, Oct. 2002 to June 2005
 - (g) Responsible for developing hydrocarbon membranes and MEAs for PEMFC for stationary and automotive applications.
 - (h) Design and Developing MEAs (hydrophilic GDLs, hydrophilic anode catalyst layer and composite membranes) for automotive applications with reduced RH conditions.
 - (i) Techno-commercial support for the Business Development Team.
- 5. **Research Associate**, University of Texas at Austin, July 1999 to Sept. 2002
 - (j) Established a Fuel Cell Laboratory
 - (k) Developed Pt-Co alloy-based catalysts for PEMFC applications
 - (l) Developed a process for low temperature synthesis of high-density cathode materials for Li-ion batteries
- 6. **Head – Technical**, Exide Industries, Madras, India, Nov. 1993 to June 1999
 - (m) Established ISO-9000 Quality system
 - (n) Developed batteries for Miners' cap lamps for underground mines
- 7. **Research Scientist**, SPIC Science Foundation, Madras, India, Jan. 1991 to Oct. 1993
 - (o) Involved in the development of electrodes (up to 400 cm²) with Pt-C catalysts for PEMFCs for automotive applications.

(c) Principal Areas of Teaching and Research

1. **Developed and Delivered Undergraduate and Graduate Courses primarily associated with Alternative Energy Technology (ALT) as well as the Engineering programs.**
 - (a) **EST200** Electronics Project Lab
 - (b) **ALT360** Renewable Energy Technologies
 - (c) **ALT410** Solar Cells and Modules
 - (d) **ALT501** Advanced Renewable Energy: Global Hydrogen Economy
 - (e) **ALT420/520** Electrochemical Energy Technologies
 - (f) **ALT502** Batteries for Portable Electronics
 - (g) **ALT503** Fuel Cells for Portable Electronics
 - (h) **ALT445/545** Stationary and Automotive Fuel cells
 - (i) **EST465/565** Statistical Process Control
 - (j) **OMT494** Sustainable Community Appraisal
 - (k) **EGR280** Engineering Statistics
 - (l) **MFG480** Advanced Statistics for Manufacturing
 - (m) **EGR530** Principles of Systems Engineering
 - (n) **EGR522** Statistical Quality Control for Manufacturing
 - (o) **EGR598** Batteries and Fuel Cells
2. **Established Fuel Cell Laboratory and conducting Research on Direct Hydrogen, Bio-fuel cells and MeOH Fuel Cells, Batteries and Solar Cells**

- (a) Developing high power MEAs with Carbon nano-tubes based electrocatalysts and nano-fibers based Gas Diffusion Layers for PEMFCs
- (b) Developing a mass production process for Gas Diffusion Layers through wire rod coating
- (c) Developing process for durable Biofuel cell fabrication
- (d) Carbon Nano-tubes
- (e) Nano Electrocatalysts
- (f) Gas Diffusion Layers
- (g) Membrane Electrode Assemblies
- (h) Covalent attachment of Glucose oxidase on to Carbon Nanotubes
- (i) Mass production of fuel cell components
- (j) Hydrogen generation and storage
- (k) Statistical Optimization
- (l) Evaluation of batteries (Thermal Cycling and Impedance)
- (m) High temperature corrosion of halide salts for CSP Application
- (n) Dye Sensitized Solar Cells

(d) Research Publications (Peer Reviewed Journal Publications)

Major Journals on Fuel cells and Renewable Energy:

- a. **Applied Catalysis B: Environmental** (Elsevier publications); **Impact Factor: 19.5**
 - b. **Journal of Materials Chemistry A** (Royal Society of Chemistry); **Impact Factor: 11.3**
 - c. **Renewable & Sustainable Energy Reviews** (Communicates the most interesting and relevant critical thinking in renewable and sustainable energy); **Impact Factor: 9.184**
 - d. **ACS Applied Materials & Interfaces** (The international forum for applied materials science and engineering); **Impact Factor: 8.07**
 - e. **Applied Energy** (The International Journal in the areas of energy conversion and conservation, the optimal use of energy resources etc.); **Impact Factor: 7.9**
 - f. **Journal of Power Sources** (The International Journal on the Science and Technology of Electrochemical Energy Systems); **Impact Factor: 6.94**
 - g. **Electrochemistry Communications** (Associated with the International Society of Electrochemistry); **Impact Factor: 4.66**
 - h. **Biofabrication** (A journal focusing on Biomaterials...); **Impact Factor: 4.302**
 - i. **International Journal of Hydrogen Energy** (Official Journal of the International Association for Hydrogen Energy); **Impact Factor: 4.054**
 - j. **Solar Energy** (The official journal of the International Solar Energy Society is devoted exclusively to the science and technology of solar energy applications); **Impact Factor: 3.868**
 - k. **Electrochimica Acta** (The official journal of the International Society of Electrochemistry); **Impact Factor: 5.116**
 - l. **Fuel Cells** (From Fundamentals to Systems); **Impact Factor: 3.149**
 - m. **Journal of the Electrochemical Society** (The official Journal of the Electrochemical Society); **Impact Factor: 3.66**
1. Brahim Laoun, Arunachala M. Kannan, Variance-based global sensitivity analysis of the performance of a proton exchange membrane water electrolyzer, **International Journal of**

H2 Energy (Under review, 2024).

2. Mandal, Sneha; Pillai, Vijayamohan; Ponraj, Mano Ranjana; Nair, Thushara; Bhagavathsingh, JEBASINGH; Grage, Stephan; Peng, Xihong; Kang, Jeon Woong; Liepmann, Dorian; Kannan, Arunachala; Thavasi, Velmurugan; Renugopalakrishnan, Venkatesan, "Tuning Graphene Oxide Interlayer Spacing through Mono-Boc Ethylenediamine Anchoring for Superior Li-ion Battery Performance", *RSC Energy Advances* (**Under review, 2024**).
3. Shuchi Sharma, Shahbaz Ahmad, Umesh Prasad, Harikrishna R. B., Keng Hsu, A.M. Kannan, and Ranga Rao Gangavarapu, Review of Laser-Based Surface Nanotexturing for Enhanced Light Absorption and Photoelectrochemical Water Splitting, *ACS Appl. Nano Materials*. (**in Press, 2024**).
4. Shahbaz Ahmad, Ganjaboy Boltaev, M. Egilmez, W. Abuzaid, Hussain Alawadhi, A.M. Kannan and A S. Alnaser, Impact of Femtosecond Laser Surface Structuring on NiCoCr and NiCoV Medium Entropy Alloy Systems for an Overall Electrochemical Water Splitting, *International Journal of H2 Energy*, **59** (2024) 1094-1105.
5. Shuchi Sharma, R. Shanmugam, R.B. Harikrishna, Umesh Prasad, G. Ranga Rao, A.M. Kannan, Y2O3 electrodeposited TiO2 nanotube arrays as photoanode for enhanced photoelectrochemical water splitting, *International Journal of H2 Energy*, **52 Part A** (2024) 1415-1427.
6. S Ahmad, AS Alnaser, W Abuzaid, F Mustafa, AM. Kannan, AS Alnaser, Efficient medium entropy alloy thin films as bifunctional electrodes for electrocatalytic water splitting, *International Journal of Hydrogen Energy*, **52** (2024) 1428-1439.
7. S Ahmad, M Egilmez, AM Kannan, AS Alnaser, Oxygen evolution reaction enhancement of copper electrodes in alkaline medium using ultrafast femtosecond laser structuring, *International Journal of Hydrogen Energy*, **52** (2024) 2-13.
8. S. Tuntithavornwat, C. Saisawang, T. Ratvijitvech, A. Watthanaphanit, M. Hunsom, A.M. Kannan, Recent development of black TiO2 nanoparticles for photocatalytic H2 production: An extensive review, *International Journal of Hydrogen Energy*, **55** (2024) 1559–1593.
9. R. Ahmed, R. Kamalanathan, V. Kandasamy, A.M. Kannan, Optimized anode, cathode and coolant flow designs for enhanced performance of proton exchange membrane fuel cells, *Int. Journal of H2 Energy*, **50** (2024) 1302-1313.
10. L. Devaraj, S.V. Thummalapalli, N. Fonseca, H. Nazir, K. Song, A.M. Kannan, Comprehending Garnet Solid Electrolytes and Interfaces in All-Solid Lithium-Ion Batteries, *Materials Today Sustainability*, **25** (2024) 100614.
11. Patiño, J.J.; Velásquez, C.; Ramirez, E.; Betancur, R.; Montoya, J.F.; Chica, E.; Romero-Gómez, P.; Kannan, A.M.; Ramírez, D.; Eusse, P.; et al. Renewable Energy Sources for Green Hydrogen Generation in Colombia and Applicable Case of Studies. *Energies* **2023**, *16*, 7809.
12. Sayli Jambhulkar, Dharneedar Ravichandran, Yuxiang Zhu, Varunkumar Thippanna, Arunachalam Ramanathan, Dhanush Patil, Nathan Fonseca, Sri Vaishnavi Thummalapalli, Barath Sundaravadivelan, Allen Sun, Weiheng Xu, Sui Yang, Arunachala Mada Kannan, Yuval Golan, Jessica Lancaster, Lei Chen, Erina B. Joyee, and Kenan Song, Nanoparticle Assembly: From Self-Organization to Controlled Micropatterning for Enhanced Functionalities, *Small*, **2023**, 2306394
13. S Ahmad, Mehmet Egilmez, Ramasamy Shanmugam, Wael Abuzaid, Shuchi Sharma, Ranga Rao Gangavarapu, Faisal Mustafa, Sami El-Khatib, Hussain Alawadhi, and A.M. Kannan, Electrochemical Hydrogen Evolution Reaction Evaluation of CoNi(Cr/V) Medium-Entropy

- Alloys in an Acidic Environment, **ACS Appl. Energy Mater.**, **6** (2023) 10652–10664.
14. T. Nair, M. Ranjana, S. Mandal, X. Peng, S. Grage, V. Renugopalkrishnan, V. Thanvasi, A.M. Kannan, K.V. Pillai, J.W. Kang, D. Liepmann, J. Bhagavathsingh, Interlayer, gallery-engineered graphene oxide using selective protection of mono-Boc-ethylenediamine as anode for sodium ion batteries, **Journal of Energy Storage**, **73** (2023) 109237.
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 16. AT Hamada, MF Orhan, AM Kannan, Alkaline fuel cells: Status and prospects, **Energy Reports** **9**, 6396-6418 (2023).
 17. U. Prasad, V. Kamavaram, G. Arumugam, A.M. Kannan, Failure Analysis of Lead-acid Batteries at Extreme Operating Temperatures, **Battery Energy**, (2023) 20230008.
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- PUREBLACK® carbon-based gas diffusion layers with pore forming agent for proton exchange membrane fuel cells, **International Journal of Hydrogen Energy**, **46** (2021) **31754-31763**.
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 31. N Tangaemsakul, A Kannan, N Tantavichet, NiCoS/carbon black based bifunctional air electrode for Zn-air secondary batteries, **Journal of Alloys and Compounds** **873** (2021) **159749**.
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 35. Umesh Prasad, Jyoti Prakash, Xuan Shi, Sandeep K. Sharma, Xihong Peng and Arunachala M. Kannan, Role of alkali metal doping in BiVO₄ for enhancing charge separation and diffusion length for photoelectrochemical water splitting, **ACS Applied Materials & Interfaces** **12** (2020) **52808-52818**.
 36. Sajid Hussain, Heiki Erikson, Nadezda Kongi, Ave Sarapuu, Jose Solla-Gullón, Gilberto Maia, A.M. Kannan, Nicolas Alonso-Vante, Kaido Tammeveski, Oxygen reduction reaction on nanostructured Pt-based electrocatalysts: A review, **International Journal of H₂ Energy**, **45** (2020) **31775-31797**.
 37. Hassan Nazir, Navaneethan Muthuswamy, Cindrella Louis, Sujin Jose, Jyoti Prakash, Marthe EM Buan, Cristina Flox, Sai Chavan, Xuan Shi, Pertti Kauranen, Tanja Kallio, Gilberto Maia, Kaido Tammeveski, Nikolaos Lymperopoulos, Elena Carcadea, Emre Veziroglu, Alfredo Iranzo, Arunachala M Kannan, Is the H₂ economy realizable in the foreseeable future? Part III: H₂ Usage and Application, **International Journal of H₂ Energy**, **45** (2020) **28217-28239**.
 38. Hassan Nazir, Navaneethan Muthuswamy, Cindrella Louis, Sujin Jose, Jyoti Prakash, Marthe EM Buan, Cristina Flox, Sai Chavan, Xuan Shi, Pertti Kauranen, Tanja Kallio, Gilberto Maia, Kaido Tammeveski, Nikolaos Lymperopoulos, Elena Carcadea, Emre Veziroglu, Alfredo Iranzo, Arunachala M Kannan, Is the H₂ economy realizable in the

- foreseeable future? Part II: H₂ storage, transportation, and distribution, **International Journal of H₂ Energy** **45** (2020) 20693-20708.
39. Hassan Nazir, Cindrella Louis, Sujin Jose, Jyoti Prakash, Navaneethan Muthuswamy, Marthe EM Buan, Cristina Flox, Sai Chavan, Xuan Shi, Pertti Kauranen, Tanja Kallio, Gilberto Maia, Kaido Tammeveski, Nikolaos Lymperopoulos, Elena Carcadea, Emre Veziroglu, Alfredo Iranzo, Arunachala M Kannan, Is the H₂ economy realizable in the foreseeable future? Part I: H₂ production methods, **International Journal of H₂ Energy**, **45** (2020) 13777-13788.
 40. Umesh Prasad, Jyoti Prakash and Arunachala M. Kannan, Effects of yttrium, ytterbium with tungsten codoping on the light absorption and charge transport properties of bismuth vanadate photoanodes to achieve superior photoelectrochemical water splitting, **Sustainable Energy & Fuels**, **4** (2020) 1496-1506.
 41. Rehan Anwar, Naseem Iqbal, Saadia Hanif, Tayyaba Noor, Xuan Shi, Neelam Zaman, Daarain Haider, Syed Aunn M. Rizvi, A.M. Kannan, MOF Derived CuPt/NC Electrocatalyst for Oxygen Reduction Reaction, **Catalysts** **10** (2020) 799-811.
 42. Ravi Nivetha, Kannan Gothandapani, Vimala Raghavan, George Jacob, Raja Sellappan, Preetam Bhardwaj, A.M. Kannan, Soon Kwan Jeong and Andrews Nirmala Grace, Highly porous MIL-100(Fe) for Hydrogen Evolution Reaction (HER) in acid and basic media, **ACS Omega**, **5**, 2020, 18941–18949.
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 45. J Sriwannaboot, A Kannan, N Tantavichet, Pulse-reverse electrodeposition of Pt–Co bimetallic catalysts for oxygen reduction reaction in acidic medium, **International Journal of Hydrogen Energy** **45** (2020) 7025-7035.
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- Solar water splitting: the role of the carbon nano materials in bismuth vanadate composite photoanodes towards efficient charge separation and transport, **Langmuir**, **35** (2019), **14492-14504**.
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35. **A.M. Kannan**, Fuel Cells for Automotive Applications, Chulalongkorn University, Bangkok, Thailand - **December 8, 2016.**
36. I. Kruusenberg, **A.M. Kannan** and K. Tammeveski, Non-noble catalysts for Alkaline Membrane Fuel Cells, US Fuel Cell Seminar, Los Angeles, CA, **November 15-20, 2015.**
37. I. Kruusenberg, S. Ratso, M. Vikkisk, P. Kanninen, T. Kallio, **A.M. Kannan** and J. Tammeveski, Enhanced oxygen reduction reaction activity of nitrogen-doped carbon nanomaterials for direct methanol alkaline fuel cell application, Electrolysis and Fuel Cell Discussions: Challenges Towards Zero Platinum for Oxygen Reduction, La Grande Motte, France, **13th-16th September 2015.**
38. Ivar Kruusenberg, Sander Ratso, Merilin Vikkisk, Petri Kanninen, Tanja Kallio, Arunachala M. Kannan, Kaido Tammeveski, Active Non-Platinum Cathode Catalysts for Direct-Methanol Alkaline Fuel Cells, Electrochemical Society meeting, Glasgow (Scotland), **July 26-31, 2015.**
39. **A.M. Kannan**, State of health determination of sealed lead acid battery under various operating conditions, Advanced Automotive Battery Conference, Detroit, MI, **June 15-19, 2015.**
40. **A.M. Kannan**, 5th International Conference on Future Environment and Energy (ICFEE 2015), **January 23-25, 2015;** Participated.
41. **A.M. Kannan**, Electrocatalysts for Low temperature fuel cells 6th International Conference on Applied Energy (ICAE2014), Taipei City, Taiwan, **May 30-June 2, 2014.**
42. A.M. Kannan, Battery performance in hot and dry conditions, Electrochemical Society meeting, **2014, May 11-15**, Orlando, FL.
43. K Vignarooban, C Tucker, D Gervasio, AM Kannan, Metal-Chloride Eutectic Mixture Based Heat-Transfer Fluids for Concentrating Solar Power Applications, Nano and Giga Challenges in Electronics, Photonics and Renewable Energy, NGC 2014, Phoenix, AZ, **March 10-14, 2014.**
44. S.H. Kolli and A.M. Kannan, Organometallic Non-Platinum Cathode for Alkaline Membrane Fuel Cells, US Fuel Cell Seminar, Columbus, Ohio, **October 21-25, 2013.**
45. A.M. Kannan, Nanocatalysts for proton exchange and alkaline membrane fuel cells, Design of Advanced Functional Materials, Kazan, Russia, **October 7-11, 2013.**
46. A.M. Kannan, Nanoenabled electrocatalysts for low temperature fuel cells, IUPAC meeting, Istanbul, Turkey, **August 10-16, 2013.**
47. S.H. Kolli and **A.M. Kannan**, Organometallic Non-Platinum Cathode for Alkaline Membrane Fuel Cells, US FC Seminar, Columbus, Ohio, **October 21-24, 2013.**
48. P. W. Li, C. L. Chan, Q. Hao, P. A. Deymier, K. Muralidharan, D. F. Gervasio, M. Momayez, S. Jeter, A. S. Teja, and **A. M. Kannan**, Halide and Oxy-Halide Eutectic Systems for High Performance High Temperature Heat Transfer Fluids, DOE SunShot Concentrating Solar Power Program Review, Phoenix, AZ, **March 22-24, 2013.**

49. Travis Curtis, Lakshmi V. Munukutla, Laura Main, Brian Fauss and **A.M. Kannan**, The Effect of Cyclic Polarization on the Measured Performance of a Dye Sensitized Solar Cell, MRS Spring Meeting, San Francisco, CA, **May 2013**.
50. Laura Main, Lakshmi V. Munukutla, Brian Fauss, Travis Curtis and **A. M. Kannan**, A Comparative Study of Quasi-solid Nanoclay Based Electrolyte and Liquid Electrolyte Dye Sensitized Solar Cells, MRS Spring Meeting, San Francisco, CA, **May 2013**.
51. B. Fauss, L. Munukutla, L. Main, T. Curtis, Gerald G. Polesky and **A.M. Kannan**, Optimizing DSSC Fabrication Using Lean Six Sigma, MRS Spring Meeting, San Francisco, CA, **May 2013**.
52. **A.M. Kannan**, Materials Challenges for Fuel Cells, Electronics and Energy Materials, Indo-US Science and Technology Forum, Trissur, India, **March 8-11, 2013**.
53. **A.M. Kannan**, Fuel cells, Batteries and Solar cells, Series of Lectures, National Fuel Cells Center, Yuan Ze University, Chongli City, Taiwan, **June 22 to July 19, 2012 (8 sessions)**.
54. I. Krusenbergs, K. Tammevesky and **A.M. Kannan**, Non-noble metal catalysts for Alkaline Fuel Cells; World Hydrogen Energy Conference - 2012, Toronto, Canada, **June 3-7, 2012**.
55. I. Kruusenbergs, L. Matisen, Q. Shah, **A.M. Kannan**, K. Tammeveski. "RDE Study of Oxygen Reduction on Non-Platinum Cathode Catalysts for Alkaline Membrane Fuel Cells" (Oral Presentation), 221st ECS Meeting, Seattle, USA **May 6-10, 2012**.
56. I. Kruusenbergs, L. Matisen, Q. Shah, **A.M. Kannan**, K. Tammeveski. "Electrochemical Reduction of Oxygen on Platinum-Free Cathode Catalysts for Alkaline Membrane Fuel Cells" (Oral Presentation) 63rd Annual Meeting of the International Society of Electrochemistry, Prague, Czech Republic, **August 19-24, 2012**.
57. I. Kruusenbergs, L. Matisen, Q. Shah, **A.M. Kannan**, K. Tammeveski. "Electrocatalysis of Oxygen Reduction on Platinum-Free Cathode Catalysts for Alkaline Membrane Fuel Cells" (Poster Presentation) 3rd CARISMA International Conference on Medium and High Temperature proton Exchange Membrane Fuel Cells, Copenhagen, Denmark, **September 3-5, 2012**.
58. **A.M. Kannan**, Research and Development on Fuel Cells and Solar Cells – CTI SMACS Brown Bag, **January 18, 2012**.
59. J. Lin and **A.M. Kannan**, Nanoelectrocatalyst for low temperature fuel cells, Villa Conference on Energy and Environmental Research, Las Vegas, Nevada, **April 21- 25, 2011**.
60. Kartik Kinhal, Lakshmi Munukutla, Aung Htun, Sailaja Radhakrishnan, Chih Y. Jen and **A.M. Kannan**, Effects of Sputtered Platinum Counter Electrode and Integrated TiO₂ Electrode with SWCNT On DSSC Performance, MRS Spring Meeting Online Proceedings, 2012.
61. C.Y. Jen, L.V. Munukutla, S. Radhakrishnan, **A.M. Kannan** and A. Htun, Influence of Cell Fabrication Procedure on the Performance of the Dye Sensitized Solar Cell, Journal of Nanoscience and Nanotechnology, Vol.11, 1-6, **2011**.
62. J. Lin, A. Adame and **A.M. Kannan**, Synthesis and Characterization of Platinum Nanocatalysts for PEM Fuel Cells, US FC Seminar, San Antonio, Texas, 10/2010.
63. Development of Multi-walled Carbon Nanotubes based electrodes for Fuel Cells, US FC Seminar, Palm Springs, California, **November 2009**.
64. **A.M. Kannan**, W. Chang, J. Dudzik, G.F. Audette, V. Renugopalakrishnan, Bio- fuel cell using covalently bonded glucose oxidase with multi-walled carbon nanotubes, 215th ECS Meeting, San Francisco, **California, May 2009**.
65. P. Kanagala, V. Veedu and **A.M. Kannan**, Development of Gas Diffusion Layers by in-

- situ CVD Process for PEM Fuel Cells, Fuel Cell Seminar, Phoenix, **October 2008.**
66. **A.M. Kannan**, K. Poornima and V. Veedu, Development of Gas Diffusion Layers by *in-situ* CVD Process for PEM Fuel Cells, Fuel Cell Seminar, Phoenix, **October 27-30, 2008.**
 67. L. Munukutla, P. Kanagala and **A.M. Kannan**, Dependence of Carbon nanotubes Synthesis on Si substrate layers, Nanotech Northern Europe 2008, Copenhagen, Denmark, **September 23-25, 2008.**
 68. **A.M. Kannan**, Nanostructured components for PEM fuel cells, NanoTr4, Istanbul, Turkey, **June 9-13, 2008.**
 69. **A.M. Kannan**, B. Rempel, B. Venezuela and L. Munukutla, Novel Technology for electronics instruction – an Electronics Studio, ASEE Meeting, Pittsburg, **June 2008.**
 70. Philip Stuckey, **A.M. Kannan**, and M. N. Ghasemi-Nejhad, Micro-porous Gas Diffusion Layers made with Multi-walled Carbon Nanotubes and Nano-chain Pureblack for Proton Exchange Membrane Fuel Cells, MRS meeting, San Francisco, **March 2008.**
 71. **A.M. Kannan**, V. Renugopalakrishnan, Pingzuo Li, and L. Munukutla, Bio-fuel cell using covalently bonded glucose oxidase with MWCNTs, International Conference on Nano-Bio Science (ICONBS), National Taiwan University, **December 05-09, 2007.**
 72. **A.M. Kannan**, Philip Stuckey and M. N. Ghasemi-Nejhad, Multiwalled Carbon Nanotubes supported Pt nanocatalysts for Proton Exchange Membrane Fuel Cells, Fuel Cell Seminar, San Antonio, **October 15-18, 2007.**
 73. **A.M. Kannan**, S. Sadananda, D. Parker, L. Munukutla and J. Wertz **A.M. Kannan**, Gas Diffusion Layers for Proton Exchange Membrane Fuel Cells by coating technique, Fuel Cell Seminar, San Antonio, **October 15-18, 2007.**
 74. M.P. Brady, P.F. Tortorelli, K.L. More, J. Pihl, T.R. Armstrong, H.M. Meyer, B.L. Armstrong, J. Henry, H. Wang, J.A. Turner, M. Wilson, F. Garzon, T. Tucker, D. Connors, J. Rakowski, D. Gervasio and **A.M. Kannan**, Stamped and Nitrided Stainless Steels for PEM Fuel Cell Bipolar Plates, Fuel Cell Seminar, San Antonio, **October 15-18, 2007.**
 75. **A.M. Kannan** and L. Munukutla, Application of Nano-technology for Energy Conversion and Storage, ASEE meeting, Honolulu, **June 2007.**
 76. **A.M. Kannan**, Nanostructured Gas Diffusion Layers for Proton Exchange Membrane Fuel cells, Materials and Devices for Energy Sources: From Nanoelectronics to Gigawatts; Satellite Workshop @ NGC2007 Phoenix, Arizona, **March 13, 2007.**
 77. **A.M. Kannan**, Gas Diffusion Layer and catalyst layer with nano-materials for PEMFCs, 8th International meeting of Advances in Electrochemical Science and Technology, Goa, India, **November 27-30, 2006.**
 78. **A.M. Kannan**, V. P. Veedu, and M. N. Ghasemi-Nejhad, Gas Diffusion Layer using carbon nanochain and carbon nano-fibers for PEMFCs, US Fuel Cell Seminar, Honolulu, **November 13-18, 2006.**
 79. C.W. Lin, Y.F. Huang and **A.M. Kannan**, Semi-interpenetrating Network As Polymer Electrolyte For Proton Exchange Membrane Fuel Cells, US Fuel Cell Seminar, Honolulu, **November 13-18, 2006.**
 80. **A.M. Kannan**, Gas Diffusion layer using nano-carbon fibers for PEMFCs “Seeing at the Nanoscale IV” Conference in Philadelphia (University of Pennsylvania), **July 17-20, 2006** (only the poster was sent).
 81. **A.M. Kannan**, B. Yanng, Karl Taft, Development of membrane/electrode assembly for automotive Fuel Cells, US FC Seminar, Palm Springs, California, **November 2005.**
 82. **A.M. Kannan**, B. Yanng, Z. Liu, Development of membrane/electrode assembly for

stationary Fuel Cells, Grove Symposium, London, **October 2005.**

83. A.M. Kannan, Tony Thampan, Development of High Performance MEAs for PEMFCs, US FC Seminar, San Antonio, Texas, **November 2004.**

84. A.M. Kannan, Tony Thampan and Ying Song A novel MEA processing for PEM fuel cells, *ECS Meeting*, Honolulu, **October 2004.**

85. A.M. Kannan, Hydrocarbon membranes for low temperature fuel cells, US Fuel cell seminar in Miami, Florida, **November 2003.**

86. A. Manthiram, S. Venkatraman, Y. Shin and A. M. Kannan, Chemical and Structural Instabilities of LiCoO₂ Cathode at deep lithium extraction, ECS Meeting, Philadelphia, **May 2002.**

87. A.M. Kannan and A. Manthiram, Synthesis of Cathode material for Li-Ion batteries, South Texas Local Section of the Electrochemical Society, Austin TX, **September 2001.**

(f) US Patents

1. Prasad, U.; Prakash, J.; **Kannan, A.M.**, Alkali metal doped bismuth vanadate photoanode for H₂ production by photoelectrochemical water splitting, **US Patent #: 11,479,872 (2022).**
2. **A.M. Kannan** and Jiefeng Lin, “Long Durable Pt/MWCNT Nanocatalyst for High Power PEM Fuel Cells”, United States Patent **9,331,341.**
3. **A.M. Kannan**, D. Parker, S. Sadananda, L. Munukutla and J. Wertz, Gas Diffusion Layer, United States Patent, **2007, filed on August 24, 2007.**
4. Karl Taft, Mathew Kurano, and **A.M, Kannan**, Composite polymer electrolytes for proton exchange membrane fuel cells, United States Patent, 7008971, **2006.**
5. **A.M. Kannan** and G. Panambur, Membrane and Membrane Electrode Assemblies for fuel cells, United States Patent 20060105215, **2006.**
6. **A.M. Kannan** and T. Thampan, Novel MEA with Enhanced Electrode/Electrolyte Adhesion and Performance Characteristics, United States Patent 20050266980A1, **2005 also WO 2005/119817 A3** (International Publication Date: December 15, 2005).
7. M. Kurano, G. Panambur, **A.M. Kannan**, and Karl Taft, Composite electrolyte with crosslinking agents, United States Patent 6962959, **2005.**
8. Manthiram. A. and **A.M, Kannan**, Surface/chemically modified oxide cathodes for lithium-ion batteries, United States Patent Application, 20030108790A1, **2003.**

(g) Professional Activities (Visits)

1. **Visited** and served as a Ph.D. Thesis Opponent on “Application of Nanomaterials for the Removal of Hexavalent Chromium and their Biological Implications” by Terrance Burks at the Royal Institute of Technology, Stockholm, Sweden - January 28-29, 2016.
2. **Visited** and served as a Session Chair (Materials Property Analysis) at the ICMEN2016 Conference, Taipei, Taiwan - May 21-24, 2016. Also presented a Paper on “Highly efficient catalysts for PEM Fuel cells”.
3. Served as a Ph.D. Thesis Opponent on “Negative Electrode Materials for Li-Ion Batteries” by Elina Pohjalainen at the Aalto University, Helsinki, Finland - June 10-11, 2016.
4. **Visiting Professor**, USA-Baltic Foundation, Riga Technical University, Latvia, October 12-16, 2015.
5. **Visitor**, National Taiwan University, Taipei, January 23-24, 2015

6. **Visiting Professor**, July 6-11, 2014, IIT Guwahati, India
7. **Distinguished Visiting Professor** – June 20 – July 20, 2012, Yuan Ze University, Jhongli, Taiwan.
8. **Principal Scientist** – October 14 –December 23, 2011, VTT Technical Research Center of Finland, Tampere, Finland.
9. **Visiting Professor** – September 1 – October 13, 2011, Tampere University of Technology, Tampere, Finland - Supported through Fulbright Specialist Program, US Department of State, USA.
10. **Visitor** – May 14-20, 2011 – University of Tartu, Estonia (supported through a grant from CRDF).
11. **Visitor**- January 28 – February 3, 2010 – Fuel Cell Center, Yuan Ze University, Jhongli City, Taiwan - Proton Exchange Membrane Fuel Cells.
12. **Visitor**- June 28 - July 2, 2009 – Hawaii Nano-Technology Laboratory, Department of Mechanical Engineering, University of Hawaii at Manoa - worked on Carbon Nanotubes for Proton Exchange Membrane Fuel Cells.
13. **Visitor**- June 15-18, 2009 – Indian Institute of Technology, New Delhi – To evaluate carbon nanotubes grown carbon paper as catalyst support structure for DMFC applications.
14. **Visitor**- June 1-11, 2009 – National Institute of Technology, India – To evaluate carbon nanotubes grown carbon paper towards solid state solar devices.
15. **Visitor** - August 8-17, 2008 – Helsinki University of Technology, Finland – Synthesis and performance of CNT based catalysts in PEM fuel cell.
16. **Visitor** - March 3-15, 2008 – National Institute of Technology, India – Delivering a series of Lectures on Alternative Energy Technologies, comprising Solar, Wind, Geothermal, Fuel cells, Batteries, Super capacitors etc.
17. **Visitor**- March 12-17, 2007 – Hawaii Nano-Technology Laboratory, Department of Mechanical Engineering, University of Hawaii at Manoa - worked on electrocatalyst impregnation directly on Carbon Nanotubes *in-situ* for Proton Exchange Membrane Fuel Cells.
18. **Visitor** – June 5-8, 2007 – Offered a short course on Nanotechnology for Fuel Cell applications, at the ITESM, Monterrey TEC, Monterrey, Mexico.
19. **Visitor** - April 23-28, 2006 – Hawaii Nano-Technology Laboratory, Department of Mechanical Engineering, University of Hawaii at Manoa - worked on catalyst deposition on Carbon Nanotubes for Proton Exchange Membrane Fuel Cells.
20. **Visitor**– May 2005, Nissan Motor Company, Japan – Fuel Cell applications and Standardization for Vehicles.
21. **Visitor** - March and April 1998 - Helsinki University of Technology, Finland - worked on self-breathing air electrodes for Air/Metal hydride batteries for EV applications with Elcat Electric Vehicles.
22. **Factory Training** - July 1998 - OLDHAM CROMPTON BATTERIES, Manchester, England - on the manufacturing of Advanced Lead/acid batteries.
23. **Factory Training** - September, 1999 - MITSUBISHI CHEMICAL CORPORATION, MISHIZUMA BATTERY PLANT, Japan, - training on Lithium-ion batteries at the product manufacturing lines.
24. **Customer Visit** - January 1997 - Zambia Consolidated Copper Mines - Zambia for carrying out Failure Analysis of Lead acid batteries -.
25. **Visiting Fellow** - June 1995 - Helsinki University of Technology, Finland - worked on

self-breathing oxygen electrodes for EV applications with Elcat Electric Vehicles.

(h) Invited Presentations

Area/Focus	Organization	Location	Date	Title
Renewable Energy	IIT-Guwahati	Guwahati, India	July 6-11, 2014	Various Renewable Energy Topics
Clean Energy Through Chem.	IUPAC	Istanbul, Turkey	Aug. 11-15, 2013	Nano-enabled catalysts for low temperature Fuel Cells
Energy Material Challenges:	Indo-US S&T Forum	Trissur, India	March 8-11, 2013	Non-Noble Catalysts for Fuel Cells
Nanotech and Fuel Cells	CINVESTAV	Mexico City Mexico	November 13, 2012	Nano-enabled high Power Fuel Cells
Fuel Cells	National Taiwan Univ	Taipei, Taiwan	July 12, 2012	High Power MEAs for PEMFCs
Nanomaterials Issues on Energy Systems	Euro-India Energy Forum	Helsinki, Finland	June 13 – 14 2011	Durable Nanocatalysts for PEM fuel cells
Energy & Environment	US-Indo Energy & Environment	New Delhi, India	December 12-15, 2010	MWCNTs based catalysts for fuel cells
Nanotechnology and Energy	Pondicherry University	Pondicherry, India	March 22-25, 2010	Nanocatalysis for fuel cells
Fuel Cells	Yuwan Ze University	Jonghli City Taiwan	January 8-13, 2010	Nano-electrocatalysts: Synthesis for PEMFC
Nanomaterials for PEMFCs	SAEST, India	Bangalore India	Nov. 23-28, 2008	Nano-electrocatalysts: Synthesis and Characterization for PEMFC
Nanosciemce and Nanotechnology	NanoTr4 Turkey	Istanbul Technical University	June 9-13, 2008	Gas Diffusion Layers and Catalysts for PEMFCs

Bionanoscience	ICONBS, Taiwan	NTU, Taipei	Nov. 28-30, 2006	Nanostructured components for PEMFC
Low Temperature Fuel Cells	SAEST, India	Goa, India	Dec. 05-09, 2007	Bio-fuel cell using covalently bonded glucose oxidase with MECNTs

(i) National and International Collaborations

I have been working with the following organizations through collaborations in areas of nanotechnology based Fuel Cell components:

1. Far Eastern Federal University, Vladivostok , **Russia**
 - a. Nanoelectrocatalyst design and development for fuel cells
2. Tartu University, Tartu, **Estonia**
 - a. Development of Nanoelectrocatalysts for low temperature fuel cells
3. Yuan Ze University, Chongli City, **Taiwan**
 - a. Development of High Temperature Polymer electrolyte for PEM Fuel cells
4. University of California at Berkeley, CA
 - a. Nanocatalyst development for low temperature fuel cells
5. University of Hawaii at Manoa, HI
 - a. Use of carbon nano-brush for catalyst support
6. Superior Graphite Company, IL
 - a. Use of Graphitized nano-carbon chain for GDL
7. Hollingsworth & Vose Company, MA
 - a. Use of micro-fibrous matrix as GDL substrates
8. Yunlin University of Technology, **Taiwan**
 - a. Development of non-Nafion electrolyte development for Fuel cells
9. Istanbul Technical University of, **Turkey**
 - a. Development of Nano-alloy catalysts for Fuel cells
10. Institute of Science and Technology at Monterrey, **Mexico**
 - a. Development of CNTs supported Nano-alloy catalysts for Fuel cells
11. National Institute of Technology, **India**
 - a. Development of nanostructured components for fuel cell

(j) Postdocs/Visitors/Students

(i) Postdoctoral Fellows Mentored

1. **Dr. Vignarooban Kandasamy** – Fuel cells for Aerospace applications – **July 2023 onwards.**
2. **Dr. Jyoti Prasad** – Development of solar thermal energy storage system using Phase Change Materials –**January 01, 2018 to December 31, 2020.**
3. **Dr. Xinhai Xu** – Electrochemical Corrosion Evaluation of Halide Salts – **August-October 2014**
4. **Dr. Vignarooban Kandasamy** – Electrochemical Corrosion Evaluation of Halide Salts - **December 2012 to July 2014**
5. **Dr. Liu Ching Han** – Development of Gas Diffusion Layers for PEMFCs – **December 2011 to August 2012**
6. **Dr. Saminathan Kulandaivel** – Development of Nano-electrocatalysts for PEMFCs – **June 2008 to January 2009**
7. **Dr. Venkat Kammavaram** - Development of Nano-electrocatalysts for PEMFCs – **July 2008 to December 2008**
8. **Dr. Senthilkumar Shanugam** – Nanocatalysts development for PEMFCs – **January 2008 to February 2008**

(ii) Visitors Mentored

1. **Shuchi Sharma** (IIT Madras, India) – Green H2 Generation by

- Photoelectrochemical water Splitting – **September 1, 2022 to March 31 2023.**
2. **Dr. Suja Jose** (Madurai Kamaraj University, India) – Evaluation of high surface area bio-carbon in supercapacitors - **May 07-30, 2018)**
 3. **Ms. Kehila Yehuda**, Synthesis and Evaluation sea weed based active carbon for alkaline O₂ reduction reaction, **March-April, 2018**
 4. **Dr. Vignarooban Kandasamy (University of Jaffna, Sri Lanka)** – Development of electrolytes for sodium-ion Batteries: **March 2016**
 5. **Brahim Laoun** (Center for Renewable Energy Development Algiers, Algérie) – Optimization of Gas Diffusion Layers for Proton Exchange Membrane Fuel Cells – from **December 14, 2016 to July 2017.**
 6. Hurpreet Gaur and Anamika Banerjee (Dayalbagh Educational Institute, Agra, India) – Development of Nanocatalysts for Photo-electrocatalytic activity for H₂ generation – **June 16, 2017 to September 30, 2017.**
 7. **Brahim Laoun** – Optimization of Gas Diffusion Layers for Proton Exchange Membrane Fuel Cells – from December 14, 2016 (Center for Renewable Energy Development Algiers, Algérie).
 8. **Anuradha Verma and Shailja sharma** – Development of Nanocatalysts for Photo-electrocatalytic activity for H₂ generation – May 10 – July 31, 2016 (Dayalbagh Educational Institute, Agra, India).
 9. **Exchange visitors from NUST and UET, Pakistan during spring and fall semesters**
 - a. Dr. Naseem Iqbal: January 22 – March 4, 2016
 - b. Gul Wahab and Salman Shahid Kunwar: January 22 – May 14, 2016
 - c. Haider Ejaz, Mujahid Wasim Durani and Noaman Khan: Aug. 10 – Dec. 11, 2016
 - d. Hassan Nazir, Mariah Batool, Usman Lahud, Humaira Asghar, Ussama Barki and Mir Meher Ali: January 15 to May 5, 2017
 - e. Abid Ullah and Khalid Khan: August 8 to December 9, 2017
 10. **Ivar Kruusenberg** – Development of non-noble metal catalysts for Alkaline Fuel Cells – **March 17-April 1, 2015** (Faculty from Tartu University, Estonia)
 11. **Mohamed Abdel Rehem** – Polymer Electrolytes for PEM Fuel Cells – **September 8-30, 2014** (Advanced Technologies and New Materials Research Institute (ATNMRI), Egypt)
 12. **Brahim Laoun** – Low temperature Fuel Cells evaluation methods – **May 5 to June 4, 2014** (Center for Renewable Energy Development, Alger, Algérie)
 13. **Ivar Kruusenberg** – Development of non-noble metal catalysts for Alkaline Fuel Cells – **June 2011 – August 2011** (Graduate student from Tartu University, Estonia)
 14. **Dr. Cindrella Luis** – Low Humidity electrodes design for PEMFCs - **January 1-30, 2010 (Faculty from NITT, India)**
 15. **Philip Stuckey** – Development of Carbon Nanotubes supported Electrocatalysts fo PEMFCs – **March 2009** (Graduate student from Hawaii Nanotechnology Laboratories, University of Hawaii at Manoa)
 16. **Dr. Cindrella Luis** – Development of gas diffusion layers for PEMFCs - **May 3-29, 2008 (Faculty from NITT, India)**

(iii) Graduate (MS) Students' Achievement – Dean's Award for Academic

Excellence

1. **Anthony Adame** – May 2012 (I was the Thesis Advisor and Committee Chair)
2. **Jiefeng Lin** – May 2010 (I was the Thesis Advisor and Committee Chair)
3. **Ximo Chu** - December 2013 (I was the Thesis Advisor and Committee Chair)

(iv) Graduate Students Mentored/Supervised (Committee Chair)

1. **Rafiq Ahmed** - Optimized anode, cathode and coolant flow designs for enhanced performance of proton exchange membrane fuel cells – **December 2023.**
2. **Grigoria Athanasaki** – Design and development of Gas Diffusion Layers for PEMFC under dry operating conditions – **May 2023.**
3. **Umesh Prasad** – **Ph.D. student** – Design and development Bismuth Vanadium Oxide based anodes for photoelectrochemical water splitting – **July 2022.**
4. **Pavan Badami** – **Ph.D. student** – Design and development Li ion conducting solid oxides for All Solid State Li-Ion Batteries – Expected to graduate in summer 2020.
5. **Xuan Shi** – **Ph.D. student** – Design and development MOF based nanoelectrocatalysts for PEM fuel cells – Expected to graduate in summer 2019.
6. **Reem Abdelhay** - EV Battery Performance in the Desert Area and Development of a New Drive Cycle for Arizona – **May 2018**
7. **Bharathi Venkatraman** – Renewable H₂ through Solar-H₂ Cycle for residential Application – **April 2018**
8. **Anuja Daiv**– Water Electrolyzer-H₂ Storage-Fuel Cell: System Integration and Analysis – **December 2017**
9. **Justin Lonchar** - The Analysis of Solar - Fuel Cell Hybrid Systems – **April 2017**
10. **Vishnu Kausic Selvan** – Evaluation of Li-Ion Batteries under EV protocol – **December 2017**
11. **Rutvik Vaidya** – Performance evaluation of Li-Ion Batteries in desert conditions in Arizona - **December 2017**
12. **Santhosh Shekar Mudunur** – Electrochemical CO₂ reduction to fuel using copper based catalysts - **July 2016**
13. **Harshal Kasat** – Design and Development of Membrane Electrode Assembly for Proton Exchange Membrane Fuel Cell – **July 2016**
14. **Pavan Badami** – Performance degradation and characterization of LiFePO₄ cells under simulated PHEV drive cycles – **June 2016**
15. **Brent Sucher** - Low Cost System for Test of Thru-Plane Thermal Transfer Coefficient – **July 2016**
16. **Rishika Venka** - Design and Development of Electrochemical Cell for Converting CO₂ to Useful Fuel – **July 2016**
17. **Jung Choi** - **Development & Characterization of Catalysts for CO₂ Reduction** – **August 2016**
18. **Rod Nesheiwat** - **Hydrogen Fuel Cell on a Helicopter: A System Engineering Approach** – **April 2016**
19. **Michael Wondrash** - Solar Implementation at STAR Middle School &
20. **SRP Hybrid Fuel Cell System integration** - **December 2016**
21. **Pushkar Kushagra** – **Battery performance in hot and dry conditions** – **August 2015.**
22. **Raghav Kusagra** – Battery performance monitoring and evaluation – **May 2015.**
23. **Sri Harsha Kolli** – Development fuel cell electrodes with ultralow Pt loading –

- December 2014**
24. **Prashanth Ganeshram** – Evaluation batteries in various operating conditions – **May 2014**
 25. **Ximo Chu** – Development of Equivalent Circuit Models for various battery systems – **December 2013**
 26. **Eric Monaco** – Optimization of Flight Time using Fuel Cell for UAVs - – **December 2013**
 27. **Jui-Chieh Wang** – Design optimization of gas flow channels for PEM fuel cells – **Left April 2013**
 28. **Maxx Patterson** - Hybrid Microgrid model based on Solar Photovoltaics with Batteries and fuel cells system for intermittent applications – **February 2013**
 29. **Jason French** - Modeling & Simulation of Bio-Inspired flow field designs for Proton-Exchange Membrane Fuel Cells – **December 2012**
 30. **Christopher Malotte** – Feasibility of Energy Harvesting Using a Piezoelectric Tire - **December 2012**
 31. **Aditi Jhalani** – Cobalt Porphyrine as Cathode Catalyst for Alkaline Fuel Cells – **July 2012**
 32. **Anthony Adame** – Development of Platinum-copper Core-shell Nanocatalyst on Multi-Walled Carbon Nanotubes for Proton Exchange Membrane Fuel Cells - **May 2012**
 33. **Rashida Villacorta** - Graphene based gas diffusion layers for use in fuel cells – **May 2012**
 34. **Quratul Ain Jawed Shah** - Non-platinum cathode catalysts for alkaline membrane fuel Cells – **April 2012**
 35. **Abshir Ahmed** - Mesh Sensitivity Analysis for Proton Exchange Membrane Fuel Cells - **December 2011**
 36. **Xuan Liu** - Comparison of Pt/MWCNTs nanocatalysts synthesis processes for proton exchange membrane fuel cells – **May 2011**
 37. **Adam Arvay** - Proton Exchange Membrane Fuel Cell modeling and simulation using Ansys Fluent - **May 2011**
 38. **Pratibhasri Nallamallepalli** – Growth and Characterization of MWCNTs for fuel cell applications – **May 2011**
 39. **Sai Priya Sundarraman** - Study the Effect of Silver Content on the Reliability of Lead-free Solder Joints – **May 2010**
 40. **Aparna Ramakrishna** - Effect of surface modification for the growth of multi-walled carbon nanotubes on carbon paper for proton exchange membrane fuel cells – **May 2010**
 41. **Jiefeng Lin** – Nano-enabled catalyst for High Power Proton Exchange Membrane Fuel Cell, **April 2010**
 42. **Dung Banh** – Fabrication and Characterization of Gas Diffusion Layers – **December 2009**
 43. **Chad Mason** - Development of Alloy catalysts for fuel cell applications – **December 2009**
 44. **Heni May** – Step-up DC to DC Converter for a Fuel Cell Power Source – **January 2009**
 45. **Roberto Santiago** – Development of Solar-Battery-Fuel Cell hybrid system for an emergency radio – **December 2008**

- 46. Wen-Chi Chang** – Fabrication and Evaluation of Conducting Polymer based PEMFC – **December 2008**
- 47. Shruthi Sadananda** – Development of gas diffusion layer fabrication process for proton exchange membrane fuel cells – **March 2008**

48. **Daniel Parker** – Hydrocarbon Membranes for Direct Methanol Fuel Cells – **March 2008**
49. **Anupam Menghal** – Development of Gas Diffusion Layer for Proton Exchange Membrane Fuel Cell – **December 2006**

(v) Committee member for Graduate Students (MS) Projects/Theses

1. **Gaurav Sharma**, Improved Synthesis and Thermal Stability of Electrode-supported α -Alumina Separator for Lithium Ion Batteries, **June 2016**.
2. **Kashyap Chimatapu**, Incorporation of Temperature Effects into runtime model for Lead Acid batteries – **July 2016**
3. **Dilip Ramani** - Cooling Strategy for effective Automotive Power Trains: 3D Thermal Modeling and Multi-Faceted Approach for integrating Thermoelectric Modules into PEMFC Stack – **December 2014**
4. **Govind Goyal** – Model based Automotive System Integration: Fuel Cell vehicle Hardware-in-the-Loop – **May 2014**
5. **Travis Curtis** - Developing Layer-by-Layer Fabrication method for DSSC – **August 2013**
6. **Motasem Katouah** – Process Improvement for Customer Quotations – Case: Electric House Company of Saudi Arabia - **April 2013**
7. **Jeffrey T. Willen** - Evaluation of Non-invasive test methods for nasal impedance - **April 2013**
8. **Mohammad Alharbi** – Closed Loop Microcontroller based Solar Tracker for Laboratory Demonstration – **April 2013**
9. **Michael Funk** – Socio-economic Advancements in Tribal STEM Technical Transfer Projects (Data collection and analysis of weather and solar PV performance in Navajo Nation) - **December 2012 (Acted as Chair but officially as a member)**
10. **Brian Fauss** - Optimizing DSSC Fabrication Using Lean Six Sigma – **December 2012**
11. **Laura Main** - A Comparative Study of Quasi-solid Nanoclay Based Electrolyte and Liquid Electrolyte Dye Sensitized Solar Cells - **December 2012**
12. **Tyler Beeney** - Standalone Mild Hybrid System Development and Application for Non-Hybrid Vehicles - **April 2012**
13. **David Wright** – Design and Installation of Residential Solar PV system – **April 2012**
14. **Michael G. Waller and Nirmal P Pandya** - PSM Solar Energy Engineering and
15. Commercialization at ASU Tempe – Assessing the Feasibility of Photovoltaic – Fuel cells Hybrid system for sustainable Off-Grid Power Generation – **June 2012**
16. **Aung Htun** - Optimization of layer thickness of TiO₂ on the DSSC performance – **May 2011**
17. **Min Miethke** – Solar Resource in Arizona – Insolation and Spectral Distribution for Photovoltaic Applications – **May 2011**
18. **Jayashree Rao** - Synthesis of Single Walled Carbon Nanotubes in an Ambient Supported by Water – **May 2011**

19. **Sailaja Radhakrishnan** - The Dye Sensitized Solar Cell Performance Study Using Different Electrolytes– **May 2011**
20. **Jesus Mejia** – Programmable DC-DC Converter – May 2011
21. **Nalini Reddy Mandadi** – Development of a current-voltage curve tracer – **May 2010**
22. **C.Y. Jen**, Design and Fabrication of DSSCs – **May 2010**
23. **Joshua Gamble** - Design of a Hydrokinetic Charging System for Electric River Boats – **May 2010**
24. **Salil Madaan** - Synthesis and Characterization Of Carbon Nanotubes – **May 2010**
25. **Radhika Lad** – Outdoor Performance rating and Spectral Effects of Photovoltaic Modules – **May 2010**
26. **Fei Wu** – Voice Control Light with Microcontroller – **May 2010**
27. **Niranj Shenoy** – Synthesis and Characterization of Single walled carbon Nanotubes – **December 2009**
28. **Chetan Chaudhari** - Electrochemical Impedance of Dye Sensitized Solar Cells - **May 2009**
29. **Sudheer Reddy Sanagala** – Characterization of Growth and Quality of Silicon Dioxide Films - **December 2008**
30. **Poornima Kanagala** –*In-situ* fabrication of CNT based GDLs for PEMFCs, Master’s Thesis – **December 2008**
31. **Sean Klett** – Direct Methanol Fuel Cell Systems Integration – **December 2008**
32. **Sudipta Dutta** - Synthesis and Characterization of Carbon Nanotubes– **November 2008**
33. **Philip A Stuckey** (University of Hawaii) – Development of Catalyst and Gas Diffusion Layers using Nanotechnology for PEMFC - Master’s Thesis - **June 2008**
34. **Sabira Enayet** - Crack initiation and growth in Pb free solder joint – Master’s Thesis – **May 2008**
35. **Fernando Vigil** – Hybrid Photovoltaic/Fuel cell Power Supply for Off-grid Security Systems – Master’s Thesis - **May 2008**
36. **Loren Fielder** – Hotspot study of Solar Photovoltaic modules – Master’s Thesis – **April 2008**
37. **Meenakshi Padmanathan**, Characterization of PWB Substrates using Thermo-mechanical Analyzer and Dynamic Mechanical Analyzer, **November 2007**
38. **Samir Sharma** – Hot Spot Evaluation of Photovoltaic Modules – **May 2007**
39. **Damian Dufau** – Strategy for Lean Education Applied to a Multidisciplinary Subject – Master’s Thesis – **January 2007**
40. **Thuria Narayan** – Evaluation of automated vision system: a Study in Non-contact Part Measurement for a Biotechnology application – Master’s Thesis – **October 2006**
41. **Hassan Qasem** – High efficiency Photovoltaic-fuel cell hybrid system for digital applications -Master’s Thesis – **May 2006**
42. **Ashok Zacharia** – Fuel Cell/Battery Hybrid electric Vehicle – Master’s Thesis – **May 2006**

(vi) Undergraduate students Mentored under the ASU/NASA Space Grant

1. Sarah Roux, **2008-2009**
2. Anthony Adame, **2009-2010**
3. Rashida Villacorta, **2009-2010**
4. Eric Hinkson, **2010-2012**
5. Payton Meade, **2013-2014**
6. Stephen Annor-Wiafe, **2015-**

(vii) Undergraduate student Mentored under FURI Grant

1. Payton Meade, **2013-2014**

(I) Professional Services

1. Editorial Work in International Energy Journals

- a **Chief Editor** – H₂ and Fuel Cells
- b **Editor-in-Chief** - Reports in Electrochemistry
- c **Assistant Subject Editor** – International Journal of Hydrogen Energy
- d **Editorial Board Member** - Journal of Membrane and Separation Technology
- e **Advisory Editorial Board** - The Open Electrochemistry Journal
- f **Advisory Editorial Board** - International Journal of Energy and Environment

2. Journal Referee Service in the Fuel Cell related research papers:

- a Solar Energy
- b Journal of Power Sources
- c Journal of the Electrochemical Society
- d Electrochemical and Solid State Letters
- e Electrochimica Acta
- f Electrochemistry Communications
- g Journal of Applied Electrochemistry
- h Journal of Physics and Chemistry of Solids
- i Journal of ASTM International
- j Materials Science and Engineering: A
- k Journal of Membrane Science
- l International Journal of Hydrogen Energy
- m Fuel Cells (Wiley Interscience)
- n Journal of New Materials for Electrochemical Systems
- o Energy and Fuels (ACS Publications)
- p Materials Chemistry and Physics
- q Catalysis Communications

3. Research grant proposal reviewer:

- a Proposal Reviewer for KACARE proposals on energy storage and SHIP (solar heat for industrial processes), **August-September 2019**
- b Proposal review for Fulbright Specialist Program (US Department of State) for Chile on Environmental Sciences, **December 2014**
- c Proposals Review for NASA EPSCoR, University of South Carolina, on

energy batteries for space missions, **2014**

- d.** Proposal review for Fulbright Specialist Program (US Department of State) for Chile on Environmental Sciences, **May 2013**
- e.** Proposals (two) Review for NASA EPSCoR, Kennedy Space Center, Florida on high energy batteries for space missions, **May 2013**
- f.** Proposal review for Israel Science Foundation (<http://www.isf.org.il>) on Electrocatalysts for Fuel Cells, **February 2013**
- g.** Proposals (five) Review for NASA EPSCoR, Kennedy Space Center, Florida on high energy batteries for space missions, **October 2012**
- h.** NSF, USA, **February and September 2012**
- i.** DOE, SunShot Program, Summer 2011 (both online and in person at the DOE, Washington DC)
- j.** NSF, USA, **September 2010**, Washington DC
- k.** NSF, USA, **February 2009**, Washington DC
- l.** NSF, USA, **March 2008**, Washington DC
- m.** National Science and Engineering Research Council, Canada, **May 2007**

4. Sessions Chaired at International Conferences:

- a.** Clean Energy through Green Chemistry, IUPAC, Istanbul, Turkey, **August 11, 2013.**
- b.** Fuel cells session, World Hydrogen Energy Conference-2012, Toronto, Canada, **June 6, 2012.**
- c.** Renewable Energy based on Nanotechnology, Green Energy Workshop, Pondicherry University, India, **March 24, 2010**
- d.** Alkaline Electrochemical Power Sources, ECS 213th meeting, **May 18-22, 2008**
- e.** Biosolar and Biofuel cells workshop, International Bionanoscience Conference, **Dec. 5-9, 2007**, Taipei, Taiwan
- f.** 8th International meeting of Advances in Electrochemical Science and Technology, **November 28-30, 2006**, Goa, India
- g.** Electrochemical Power Sources, ECS 206th Meeting, **October 3-8, 2004**, Honolulu, HI

5. Outreach Activities:

- a.** PhD Thesis Evaluation: Mechanical and Metallurgical Properties of Varying Particle Size and Varying Cooling Rate of Magnesium Alloy Composites Using Powder Metallurg, S.Kanthasamy, Hindustan Institute of Technology and Sciences, Madras, India, January 2023.
- b.** PhD Thesis Evaluation: Synthesis of electrochemically active materials for fuel cells and sensor applications, N. Manivannan, Madurai Kamaraj University, Madurai, India, January 2023.
- c.** Promotion and Tenure Letter for promotion from Associate to full professor in respect of Dr. Chaouki Ghenai, Sustainable and Renewable Energy Engineering Department, College of Engineering, University of Sharjah, UAE, December 2022.

- d. PhD Thesis Evaluation: Performance of Hematite and Bismuth Vanadate based Photocatalysts in Photoelectrochemical Reactor for Hydrogen Production, Aditya Singh, IIT Delhi, India, June 2022.
- e. PhD Thesis Evaluation: Development of All Solid State Supercapacitors Delivering High Power Density using Carbon Derived from P.juliflora versus Pure and Transition Elements Doped Zinc Cobaltite, G.G. Soundarya, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, India, June 2022.
- f. Associate Editor - International Journal of Hydrogen Energy, Handled about 260 Manuscripts on Fuel cells and Hydrogen Technologies, January to December, 2022
- g. Promotion and Tenure Letter for promotion from Associate to full professor in respect of Dr. Pejman Kazempoor, School of Aerospace and Mechanical Engineering, University of Oklahoma, USA, August 2022.
- h. Associate Editor in International Journal of Hydrogen Energy - Handled about 200 Manuscripts for the 2018.
- i. Reviewed Fulbright applications from Finland – September 2018
- j. Reviewed Fulbright applications from India – October 2018
- k. Reviewed Fulbright applications from USA – October/November 2018
- l. Reviewed Fulbright applications from Egypt – December 2018
- m. Reviewed > 20 Manuscripts for Journal of power Sources, Applied Energy, Int. J. H2 Energy - 2018
- n. Conducted a GIAN (Global Initiative of Academic Network) workshop on Advanced Energy Storage Applications at the NIT Hamirpur, India - December 2017
- o. Reviewed 13 proposals on renewable energy for “National Centre of Science and Technology” The Republic of Kazakhstan, November 2017
- p. Associate Editor (promoted from Assistant Editor) in International Journal of Hydrogen Energy, Handling > 5 Manuscripts every week, 2017
- q. Assistant Editor in International Journal of Hydrogen Energy - Handled about 100 Manuscripts for the 2017.
- r. Serving as Graduate Program Chair at the TPS – MS Engineering and Manufacturing Engineering and PhD Systems Engineering, since July 2017
- s. Conducted a GIAN (Global Initiative of Academic Network) workshop at the NIT Hamirpur, India on Advanced Energy Storage Applications, December 8-12, 2017
- t. Conducted a GIAN (Global Initiative of Academic Network) workshop at the NIT Trichy, India on Renewable Energy Systems, December 4-8, 2016
- u. Reviewed 13 proposals on renewable energy for “National Centre of Science

and Technology” The Republic of Kazakhstan, November 2017

- v. Associate Editor (promoted from Assistant Editor) in International Journal of Hydrogen Energy, Handling > 5 Manuscripts every week, 2017
- w. Assistant Editor in International Journal of Hydrogen Energy - Handled about 100 Manuscripts for the 2017.
- x. Serving as Graduate Program Chair at the TPS – MS Engineering and Manufacturing Engineering and PhD Systems Engineering, since July 2017
- y. Served as Judge for AZ Science and Engineering Fair for the Environmental Engineering Senior Projects, Phoenix, AZ during **April 1, 2014**.
- z. Mentored the S-Labs (<https://s-labs.co/home.html>) program funded by Intel’s Sustainability in Action program to help Minors trigger research and development on STEM. Students mentored for developing fuel cell and electrolyzer are Rana Sarsour rana.sarsour@gmail.com and Fatima Rahee <jsmine123456789@gmail.com>
- aa. I served as a Marshall for the CTI for the Fall 2013 during the undergraduate graduation Ceremony, Wells Fargo Arena, ASU-Tempe.
- bb. Serving as Vice Chair of the CTI College Assembly Executive Council and the also the Chair of the CTI Personnel Committee during **2013-2014**.
- cc. Served as Special Award Judge at the **Intel ISEF 2013**, Phoenix, AZ during **May 14-15, 2013**.
- dd. Served as a Judge on the Navajo Nation Science Fair, Gallup, NM during **February 27-28, 2013**, sponsored by CTI.
- ee. Served as a Search Committee member for the Tenure Track Energy Systems position from **fall 2012-Spring 2013**.
- ff. During **spring 2011-2012** (excepting fall 2011), I lead a team of CTI faculty in developing an Alternative Energy Technology minor (CTI wide) and developed/consolidated a set of courses and presented the ALT curriculum for the CTI on **January 23, 2012**.
- gg. Served as a Judge on the Navajo Nation Science Fair, Gallup, NM during **February 28-29, 2012**, sponsored by CTI.
- hh. Visited and participated on a voluntary basis a meeting at the Navajo Technical College, NM to help out with solar system evaluation and correlation of weather and solar energy generation performance data, on **March 14, 2012**.
- ii. Organized and participated a Students’ team during **May 6-11, 2012** to help install residential solar systems at the Navajo Nations along with Mark Sneider Electric and Iina Solutions.
- jj. I was appointed as one of the Assistant Subject Editors for the ***International Journal of Hydrogen Energy***, for handling manuscripts on fuel cells and electrolyzers. This is the best recognition I have earned in my carrier on energy areas through research, publications and participation in international

meetings.

- kk. Chaired a Session on fuel cells at the World Hydrogen Energy Conference during **June 4-8, 2012**, Toronto, Canada and also gave a lecture on fuel cells.
- ll. Visited CINVESTAV, Mexico during **November 14-17, 2012** on invitation to make a presentation on nanomaterials for fuel cells.
- mm. Participated in Explore What's in Store Participants! Organized by Kathy Bareiss, Organizational Lead for Mesa Public Schools, I organized a team (Anthony Adame (graduate student), Eric Hinkson (undergraduate student) and Dr. Xihong Peng, ASM faculty) from CTI to make a presentation on Solar Hydrogen cycle as part of ALT program marketing, Mesa Counts on College, Mesa Convention Center, **January 19, 2012**.
- nn. Chaired a Session on Renewable Energy at the Eicon (Euro Indo Forum on Energy) workshop, Helsinki, Finland, **June 15-18, 2011**.
- oo. Served as University Senate to represent ET department during **fall 2009-spring 2011**.
- pp. Promoted ESD's Alternative Energy Technology program at the Mesa Community College during the **Green Day Celebration** by displaying a Table with promotional materials, on **March 27, 2008**.
- qq. Demonstrated (Solar PV – Electrolyzer – Hydrogen – Fuel Cell) and talked to the students at the Lowell Elementary (Phoenix Educational District), as part of Environment Awareness Week Celebration (April 13-19) during the school day and Science Night on **April 17, 2008**.
- aa. Organized and Participated in Fuel Cell Educators's Meeting for the US Fuel Cell Seminar to be held in Phoenix Convention Center during October 26-30, 2008, at the Hyatt on **May 14, 2008**.
- bb. Conducted a Short course on "**Nanotechnology: Application and characterization Techniques**" during **October 6-10, 2007** at the Arizona State University for the students from ITESM, Monterrey, Mexico.
- cc. Conducted a Short course on "**Nanotechnology: Energy Applications**" during **June 5-7, 2007** at the ITESM, Monterrey, Mexico.
- dd. Served as **Judge** at the "Rack-N-Roll" **2007** First Robotics Competition (Veterans Memorial Coliseum, Phoenix, AZ) during **March 8-10, 2007**, where 35 regional schools participated.
- ee. Served as **Judge** for Fifth Annual Arizona American Indian Science and Engineering Fair on **March 2nd 2007**, at Mesa Convention Center.
- ff. Served as **Judge** for Central Arizona Regional Science and Engineering Fair on **March 20th 2007**, at Mesa Convention Center.
- gg. Served as **Judge** for Gila River Science and Engineering Fair on **March 03, 2006** at Sacaton Middle School, Arizona
- hh. Served as **Technical Inspection Team member** for Arizona's BattleBots IQ, on **April 1 2006**, at the at the East Valley Institute of Technology in Mesa

- ii. **Mentored** 6 students from Higley Academy during **Fall 2006** at the ESD – made a presentation on Alternative Energy Sources focusing on fuel cells
- jj. Served as **Scientific Committee Member and Technical Advisory Committee member** for the “Multifunctional Nano-Composites – International Conference”, Honolulu, HI, **September 20-22, 2006**
- kk. Served as **Judge** for Fourth Annual Arizona American Indian Science and Engineering Fair on **March 13th 2006**, at Mesa Convention Center.
- ll. Gave a Fuel Cell demonstration and talked to the senior students at the Desert Ridge High School, Mesa to instill interest in them to pursue their higher studies in the energy related areas. About 30 students visited the FC lab on January 17th and I taught them about the fuel cells to create interest in them.

6. Committee Service:

School/College/University Level

- a Search Committee Chair, Clean Energy Systems, 2024-25
- b Search Committee Chair, Clean Energy Systems, 2022-23
- c Ad Hoc Committee Chair, Tenure for MSN Director, 2022
- d Ad Hoc Committee Chair, New faculty, HSE in TPS, 2022
- e Search Committee Chair, Automated and Connected Vehicles, 2021-2022.
- f Serving in the Dean’s Faculty Advisory Council for Tenure and Promotion, **since fall 2017.**
- g Faculty Search Committee Chair, Automotive Faculty 2014-2015
- h Serving as the P&T Committee Chair for The Polytechnic School for reviewing promotion/Tenure, probationary and the annual performance packages, from the fall **2014 for three years.**
- i Serving on the Limited Submissions Standing Review Panel for **FY2014-2017** for the OKED. Involved in the DOE and NSF limited submission proposals.
- j Serving as, Editor-in-Chief in reports in Electrochem., Assistant Editor in Int. J. H2 Energy and also become a Chief Editor for H2 and Fuel Cells in **2014.**
- k Have reviewed > 20 Journal Manuscripts for various energy journals in **2014.**
- l The best recognition I have earned is the approval to serve on the Peer Review Committee for the Fulbright Specialist Program. Served on the Fulbright Specialist Program Environmental Science Peer Review Committee during the **2014 and 2013.**
- m Served as a reviewer for the 2014 Experimental Program to Stimulate Competitive Research (EPSCoR) review process, **June, 2014.**
- n Served as the CTI Personnel Committee Chair during **2013-2014** and reviewed P&T and probationary packages.
- o Nominated from the Engineering Department for the College Executive Assembly Executive Council from **Fall 2013**
- p Engineering Department Personnel Committee for the Annual Review of tenured/tenure track faculty, **spring 2013.**

- q** University Senate representative for Engineering Technology (2009-2011)
- r** University Senate representative for Electronic Systems (2008-2009)
- s** Electronic Systems Department curriculum Committee Member (fall 2006-spring 2008)
- t** Electronic Systems Department Equipment Committee Chair (fall 2007-spring 2008)
- u** Faculty Advisor – ASU Polytechnic Project Club (since fall 2006-spring 2010)
- v** Responsible for conducted Comprehensive examination for graduating undergraduates during **fall 2005 and spring 2006** required for ABET

National Level

- a** Materials & Components Working Group, US Fuel Cell Council, Fuel Cell Seminar Luncheon Workshop Meeting, Thursday, **November 4th, 2004**, San Antonio, TX
- b** Materials & Components Working Group, US Fuel Cell Council, Fuel Cell Seminar Workshop Meeting, **November 17th, 2005**, Palm Springs, CA
- c** Materials & Components Working Group, US Fuel Cell Council, Fuel Cell Seminar Workshop Meeting, **November 16th, 2006**, Honolulu, HI
- d** Working Committee member (Breakout session) for Catalyst development for alkaline FCs, Alkaline membrane FC workshop at Phoenix, Organized by LANL (Dr. Bryan Pivovar), **December 11-13, 2007**

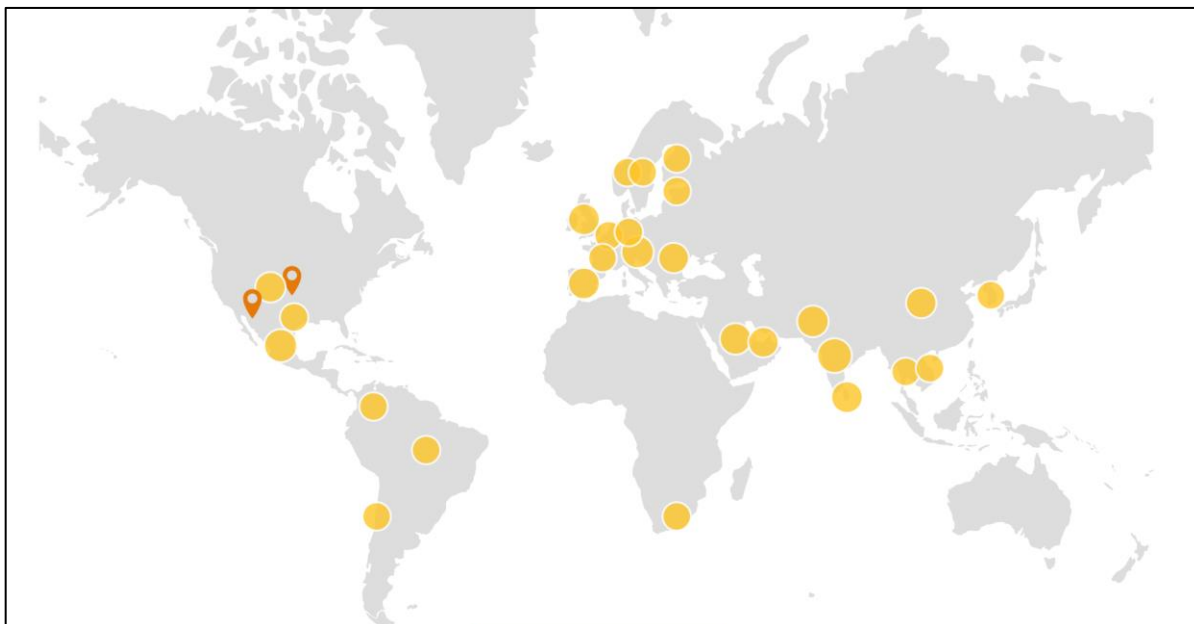
(m) Professional Affiliations

- a.** Active Member – The Electrochemical Society, USA (**Since 1999**)
- b.** Member - Sigma Xi, The Scientific Research Society, USA (**Since 2002**)
- c.** Member – American Society for Engineering Education, USA (**2007-2010**)

(n) Professional Awards/Recognition

- a.** Award of Fulbright Distinguished Chair (Aalto University) by the Council for International Exchange of Scholars (Fulbright Scholarship), US Department of State, USA (**June 01 to November 30-2018**)
- b.** Award of Fulbright Specialist by the Council for International Exchange of Scholars (Fulbright Scholarship), US Department of State, USA (**2011 to 2015**)
- c.** ASU-CTI Dean's award for Faculty Excellence in Service - **2013**
- d.** ASU-CTI Dean's award for Faculty Excellence in Scholarly and Creative Activities - **2011**
- e.** Support of Student Leaders & Achievers" award in recognition of outstanding leadership in **spring 2012** by the ASU-CTI Executive Dean
- f.** Marquis WHO's WHO in America **2009 Edition**
- g.** Best Employee Award - Exide Industries Limited (**1998**)
- h.** University 2nd Rank Award in M.S. Chemistry – Madurai University (**1985**)

Research Network: <https://asu.pure.elsevier.com/en/persons/arunachala-mada-kannan>





Certificate of Completion

*The J. William Fulbright Foreign Scholarship Board
and The Bureau of Educational and Cultural Affairs*

of the

United States Department of State

award this certificate to

Arunachala Nadar Mada Kannan

in recognition of successful completion of the

Fulbright Scholarship Program

November 2018
Washington, DC

Chair, J. William Fulbright
Foreign Scholarship Board

Assistant Secretary of State
Bureau of Educational and
Cultural Affairs

