Krishnadas Narayanan Nampoothiri, Ph.D.

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Career Objective

Proactive researcher and lecturer with a PhD degree in Engineering (Microfluidics) seeking postdoctoral positions in well regarded institutions supporting fundamental and applied research.

Career Summary

Mechanical Engineer with two years of teaching experience and seven years of research experience in fundamental/ interdisciplinary research.

Research Interests

- Microfluidics
- Microscale and nanoscale heat transfer
- Nanoengineered/nanostructured surfaces

Skills

Soft Skills: Technical writing, oral communication, team player, problem solver, creative and critical thinker, self-motivated, time management, continuous and quick learner, positive criticism, supervision.

Software skills: C, C++, MATLAB, COMSOL, AUTOCAD, SOLID WORKS, SPICE, ImageJ, Adobe Photoshop, Clewin, Origin, M.S.Office.

Laboratory skills: Micro/Nano Fabrication, Micro/Nano Characterization, Microfluidics

Leadership qualities

- Vice-Chairman for IEEE NC and SC Council, IISc Bangalore for 2016
- IEEE NC and SC member for three years (2015-2018)
- Head of the Correspondence Team, IEEE CeNSE society - THINK NANO national symposium (2016 and 2017)

Awards and Honors

- Gold Medalist, M Tech Nanotechnology.
- Qualified GATE 2011 and GATE 2012

Courses taken during Ph.D.

Microfluidics, Micro and Nano Characterization Methods, Micro and Nano Fabrication

Research Experience

- **Research Associate (March 2021-Current)**
  Indian Institute of Technology Madras, India
- **Fellow Postdoc (September 2020-January 2021)**
  Kansas State University, U.S.A
- **Research Associate (July 2019-July 2020)**
  Indian Institute of Science Bangalore, India

Teaching Experience

- **Teaching Assistant (2017 March)** Indian Institute of Science
  Course taught:
  COMSOL Multiphysics® (as a part of Micro/Nano Mechanics)
- **Assistant Professor (2013-2014)** Amrita School of Eng.Kollam
  Courses taught:
  Mechanics of Solids (Theory, 3rd Sem B. Tech Mech. Eng.)
  Mechanics of Solids (Lab, 3rd Sem B. Tech Mech. Eng.)
  MEMS (4th Sem B. Tech Mech. Eng.)
  Nanotechnology (1st Sem M. Tech Heat and Fluids Eng.)
  Micro Heat Transfer (2nd Sem M. Tech Heat and Fluids Eng.)
- **Lecturer (2010-2011) Mangalam College of Eng, Kerala**
  Refrigeration and Air Conditioning (7th Sem B. Tech Mech.)
  Fluid Mechanics (Lab, 3rd Sem B. Tech Mech.)
  Basic Mechanical Engineering (1st Sem B. Tech Mech.)

Industrial Experience

- **Graduate Trainee (2010)** K.P.A Engineering, Surat, Gujarat
- **Graduate Apprentice (2009)** Apollo Tyres Limited, Kerala

Academic Record

- **Ph.D.** (2019, CGPA: 6.3/8)
  Indian Institute of Science Bangalore
  Thesis title: Investigations on Joule heating and associated effects during liquid dielectrophoresis of aqueous droplets.
  Supervisors: Prof. Prosenjit Sen and Prof. M.S.Bobji
- **M.Tech Nanotechnology** (2013, CGPA: 9.42/10)
  National Institute of Technology Calicut
  Thesis title: Nanostructured materials for the improvement of anodic performance in direct methanol fuel cell
  Supervisor: Prof. N. Sandhyarani
- **B. Tech Mechanical Engineering** (2009, 78.3 %)
  Mar Athanasius College of Engineering, Kothamangalam

Grants and Fellowships

- TRF Travel Grant for MEMS Conference 2017 in USA
- CMBS Travel Grant for MICROTAS Conference 2017 in USA
- CSIR Travel Grant-MICROTAS Conference 2017 in USA
- MHRD Fellowship for master's and Ph.D.

Projects Involved

Research Associate (2021-Current)

○ Development of on-chip microfluidic temperature controller for biological applications

Postdoc (2020-2021)

○ Utilization of generated micron sized droplets using electric fields for digital assay

Research Associate (2019-2020)

○ Investigation of forces behind dumbbell shaped droplets during liquid dielectrophoresis

○ Study of satellite droplets during electrowetting

Ph.D. (2014-2019)

○ Development of a direct heating technique for Lab-on-Chip applications based on Joule heating of droplets

○ Successfully demonstrated of direct heating technique for de-icing applications

○ Investigated the physics behind the formation of droplet streams and flying droplets during liquid dielectrophoresis

M. Tech (2012-2013)

○ Investigation of nanoparticles on graphite disc as anode electrode for direct methanol fuel cell

○ Effectively developed a novel method for synthesis of Palladium Nanocoral on Graphene (PNCG)

B. Tech (2009)

○ Study of fuel-oxidizer combination from green propellants for propellent engine.

○ Optimized the fuel-oxidizer combination

Publications

1) **K. N. Nampoothiri**, M.S Bobji and P. Sen, “De-icing Device with Self- Adjusting Power Consumption and Ice Sensing Capabilities” Journal of Microelectromechanical Systems 29 (4), 562-570, 2020 (featured in Heise magazine c’t 2020).

2) T. Radhakrishnan, **K. N. Nampoothiri** and N. Sandhyarani, "Enhanced electro-catalytic activity of palladium nanocoral structures with platinum incorporation", Electrochimica Acta, 340, 135840, 2020.

3) **K. N. Nampoothiri**, M.S Bobji and P. Sen, “Generation of micron-sized droplet streams by high frequency electric fields,” International Journal of Heat and Mass Transfer, 145C, 118709, 2019.

4) **K. N. Nampoothiri**, M.S. Seshayee, V. Srinivasan, M.S Bobji and P. Sen, “Direct heating of aqueous droplets using high frequency voltage signals on an EWOD platform”, Sensors and Actuators B, 273, 862-872, 2018.

Manuscripts under preparation

1) **K. N. Nampoothiri** and P. Sen, “Motion of Generated Dumbbell-Shaped Satellite Droplets during Liquid Dielectrophoresis” under review in Journal of Micromechanics and Microengineering.

2) Nitish Sagar, **K. N. Nampoothiri** and P. Sen, "Study of sub-harmonic oscillations of satellite droplets during electrowetting".

3) Nitish Sagar, **K. N. Nampoothiri**, Shubhi Bansal and P. Sen, "Droplet oscillations during Electrowetting- A Review".

Conferences

1) **K. N. Nampoothiri**, M.S Bobji and P. Sen,” High voltage liquid dielectrophoresis as a heating technique for generation of droplet streams”, 4th Indian Conference on Applied Mechanics 2019, IISc Bangalore (oral).

2) **K. N. Nampoothiri**, M.S Bobji and P. Sen, “Formation of Droplet Jet by Enhanced Condensation of a Heated Drop Subjected to AC Electric Field”, Electrowetting Conference 2018, University of Twente, The Netherlands (poster).

3) **K. N. Nampoothiri**, M.S. Seshayee, V. Srinivasan, M.S Bobji and P. Sen, “Direct Heating of Droplets for Chemical and Biological Reactions on Lab-On-Chip Devices using High Frequency AC Voltage” MicroTAS 2017: The 21st International Conference on Miniaturized Systems for Chemistry and Life Sciences, Savannah, U.S.A (poster).

4) **K. N. Nampoothiri**, V. Srinivasan, M.S Bobji and P. Sen, "A Novel Sub-Picoliter Monodispersed Droplet Generation Device based on Liquid Dielectrophoresis" 30th IEEE Conference on Micro Electro Mechanical Systems (MEMS 2017), Las Vegas, U.S.A (oral).
5) **K. N. Nampoothiri**, V. Srinivasan, M.S Bobji and P. Sen, "Active Thermal Cooling Using Liquid Dielectrophoresis" 3rd International Conference on Emerging Electronics (ICEE 2016), IIT Bombay, Mumbai, India (oral).
6**) K.N. Nampoothiri** and N. Sandhyarani, "Graphene supported metal nanoparticles as anode material for direct methanol fuel cell", 1st Indo-Israel Meeting, Mahatma Gandhi University, Kottayam, Kerala, India, 2013 (poster).

References

1) **Prof. Prosenjit Sen,** Centre for Nano Science and Engineering, Indian Institute of Science, Bengaluru, India-560012, Email ID: prosenjits@iisc.ac.in
2) **Prof. M.S.Bobji,** Department of Mechanical Engineering, Indian Institute of Science, Bengaluru, India-560012, Email ID: bobji@iisc.ac.in
3) **Prof. Vinod Srinivasan,** Department of Mechanical Engineering, University of Minnesota, U.S.A-55455 Email ID: vinods@umn.edu
4) **Prof. N. Sandhyarani,** School of Materials Science and Engineering, National Institute of Technology Calicut-673601 Email ID: sandhya@nitc.ac.in