Amin Mansoorifar

Research Assistant at Southern Methodist University

aminmansourifar@gmail.com

Experience

Research Assistant at Southern Methodist University
January 2015 - Present (1 year 8 months)

Lecturer at Pooya University
September 2014 - November 2014 (3 months)

Courses:
Pre-U Mathematics
Mathematics VI
Mathematics VII
Numerical Analysis

MSc Candidate at University of Shiraz at Shiraz University
September 2012 - September 2014 (2 years 1 month)

Thesis: "Numerical Study of Ionic Transport Due to Electroosmotic Flow in Nanochannels" Supervised by Dr. Reza Kamali

Teaching Assistant of Fluid Mechanics II at Shiraz University
September 2013 - February 2014 (6 months)

Teaching Assistant of Gas Flow Dynamics at Shiraz University
February 2013 - July 2013 (6 months)

Teaching Assistant of Heat Transfer at Shiraz University
February 2013 - July 2013 (6 months)

Teaching Assistant of Fluid Mechanics II at Shiraz University
September 2012 - February 2013 (6 months)

Languages

Persian (Native or bilingual proficiency)
English (Professional working proficiency)

Courses

Master of Science (MSc), Energy Conversion

Shiraz University

Advanced heat tranfer (Convection)	16.8/20 (Top 5%)
Advanced Mathemetics I	14.5/20 (Upper average)
Advanced Fluid Mechanics	16.5/20 (Top 5%)
Viscous Flow Theory	19.1/20 (Top score)
Research Methods	18.4/20 (Top 5%)
Continuum	16/20 (Top 5%)
Micro/Nano Fluidics	19.8/20 (Top score)

Independent Coursework

HSE

Piping Principles

Gambit

Fluent

Skills & Expertise

Fluid Mechanics
Heat Transfer
Matlab
CFD
Fluid Dynamics
Simulations
ANSYS
COMSOL
Thermodynamics
Numerical Analysis
Microsoft Office
Finite Element Analysis
Dynamics
LaTeX
Mechanical Engineering
Continuum Mechanics
Microfluidics
Mathematical Modeling
Modeling
AutoCAD
Research

Electrokinetic Phenomena
SolidWorks
Microfabrication
Photolithography
Microelectronics
Impedance Spectroscopy
Soft Lithography
Clean Rooms
3D Printing
Stereolithography

Education

Southern Methodist University
Doctor of Philosophy (Ph.D.), Mechanical Engineering, 2015 - 2019

Shiraz University
Master of Science (MSc), Energy Conversion, 2012 - 2014

Shiraz University
Bachelor of Science (BS), Fluid Mechanics, 2008 - 2012

Razi High School
Mathematics & Physics, 2004 - 2008

Interests

Research, Movies, Hiking, Computer Games, Music

Certifications

HSE MANAGEMENT SYSTEMS (Internal Audit)
TUV Rheinland License HSE-A-12/53 62 March 2012

Piping (Piping Construction)
License 1579/2/74716 May 2012

Computational Fluid Dynamics (CFD) with FLUENT & GAMBIT
Navid Educational Group License 30816 September 2012

Publications

Effect of Rectangular Obstacle Position and Aspect Ratio on Mixing Performance of ICEK Micromixers
ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting and 12th International Conference on Nanochannels, Microchannels, and Minichannels August 2014
Authors: Amin Mansoorifar, Reza Kamali, Mohammad karim Dehghan manshadi

Micromixers play very significant roles in many fields of researches such as chemical, biological and medical. Today, a vast range of studies investigated on micromixers in order to improve their mixing efficiency. Some researchers focus on micromixer channel geometry to improve mixing index but these researches also lead to a greater pressure drop while mixing index improvement was not too much. In order to come up with this problem, many studies prone to use the electrokinetic effects to increase mixing

efficiency. In such streams, an effective way to increases the efficiency of a micromixer is increasing flow disturbances. One way is using electrical properties of specific materials. In this study, initially the electroosmotically driven flow through a microchannel with embedded conducting triangular hurdles is considered which was experimentally done by Wu et al. in order to validate the solving procedure. After that, a conducting obstacle is put in the flow stream. The effect of aspect ratio of this obstacle on mixing efficiency is investigated. In addition, the effect of the place of the obstacle in the channel on mixer efficiency is studied. The results show that the place of this obstacle in the stream is very important. First, the obstacle is placed in the middle of the channel. Second, it is placed near to one of the walls. The results show that if the obstacle placed near to one of the walls, the efficiency would increase more than the first position. Moreover, the results reveal that the aspect ratio of the obstacle has effects in the efficiency. To sum up, the results show that position of the obstacle and aspect ratio of the obstacle has significant roles in the efficiency of micromixers. This study shows that more researches could be carried out in the induced charge electrokinetic micromixers.

Numerical Simulation of a Novel Micromixer Based on Oscillating Microplate

ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting and 12th International Conference on Nanochannels, Microchannels, and Minichannels August 2014

Authors: Amin Mansoorifar, Reza Kamali, Firuze Soltani

Mixing plays an important role in microfluidic devices regarding optimization of chemical and biochemical reactions. Besides, many biological processes such as cell-activation, enzyme reaction, and protein folding are often based on reactions that require mixing of reactants for instigation. Moreover, many production processes, as well as, many other detection methods need complete mixing of the regents. Because of low velocities associated with fluid fow in microchannels, it is too difficult to mix the streams in a homogenous way. In this paper, a novel micromixer is simulated which consists of an oscillating microplate in a microchannel to enhance mixing index. The equations of fluid flow and mass diffusion are discretized and solved with finite element method and ALE method is used for considering mesh movement and the performance of micromixer is characterized by mixing index. The results revealed that by increasing the amplitude of oscillating plate, the mixing index enhances, however, increasing plate length and Reynolds number decrease mixing index. The results also revealed that plate frequency and thickness have no considerable effect on mixing index.

Effect of Baffle Geometry on Mixing Performance in the Passive Micromixers

Iranian Journal of Science and Technology: Transactions of Mechanical Engineering November 2014

Authors: Amin Mansoorifar, Reza Kamali, Mohammad karim Dehghan manshadi

Micro and nano-fluidic mixing nowadays is a very important area in research due to its crucial role in new technologies and applications such as biomedical and biochemical synthesis. Due to the low velocities associated with microscale flow, it is often very difficult to mix fluids in a rapid and homogeneous manner. One of the methods of enhancing fluid mixing is to obstruct the fluid flow using vanes or panels known as baffles. In this paper, a Computational Fluid Dynamics (CFD) approach is used to study the effect of baffles on the mixing performance in a passive micromixer. The numerical method is verified by comparing its obtained results with experiments and numerical results published earlier. Rectangular, semi-circular

and triangular baffles have been considered for investigating the effects of baffle geometry on mixing performance. Furthermore, the effects of channel inlet angle and baffles offset in mixing performance is studied. As the results show, there is a two-fold increase in mixing performance in the baffled cases as opposed to the simple case.

Numerical Analysis of non Newtonian Fluid Flow in a Low Voltage Cascade Electroosmotic Micropump
Microsystem Technologies 2015

Authors: Mohammad karim Dehghan manshadi, Amin Mansoorifar, Reza Kamali

In microfluidic devices, many fluids have non-Newtonian behaviors, especially biofluids. The viscosity of these fluids mostly depends on the shear rate. Sometimes the non-Newtonian fluids should be transferred by micropumps in lab-on-chip devices. Previous researchers investigated the flow rate in simple electroosmotic flow micropumps which have a simple channel geometry. In the present study, the effects of non-Newtonian properties of fluid in a low voltage cascade electroosmotic micropump are numerically investigated ...

ELECTROTHERMALLY DRIVEN FLOW AT HIGH CONDUCTIVITY MEDIUM
ICNMM 2015 2015

Authors: Anil Koklu, Amin Mansoorifar, Ahmet Can Sabuncu, Ali Beskok

Electrothermal flow is due to presence of permittivity and conductivity gradients, which are induced by Joule heating in liquids with finite conductivity. Electrothermal flow is inevitable for microfluidic systems that contains electrical energy dissipation as heat energy. In many biomedical studies, electrothermal flow is used to enhance performance of diffusion driven systems. However, a comprehensive theory is absent for the electrothermal flow in physiological buffers, and the current theory does not match experimental observations at physiological conditions. Many practical examples involve liquid conductivities at physiological strength, and therefore, microfluidic systems that imparts electrical energy for particle manipulation is prone to electrothermal flow. Here, we summarize our recent observations and numerical simulations of electrothermal flow at physiological conductivity using different channel heights (20 , 60 , 100 , 200 , 500 and 1000) and various excitation frequencies (between 50 kHz to 20 MHz). Flow field is measured by micro Particle Image Velocimetry technique. The micro-chamber includes 3 electrode pairs, where electrode width is 500 and inter-electrode gap distance is 50 . A global flow consisting of two counter vortices is observed. Effect of the liquid conductivity is examined while other parameters are kept constant. Number of vortices is changed with different liquid conductivities. For our ...

Platinum black electrodeposited thread based electrodes for dielectrophoretic assembly of microparticles
AIP 2016

Authors: Amin Mansoorifar

We report dielectrophoretic(DEP) assembly of biological cells and microparticles using platinum-black electrodepositedconductive textile fiber. The three-dimensional conductive structures with high aspect ratios were found to facilitate high electric field regions, as revealed by scanning electron microscope characterization. The effective conducting area (Aeff) and its stability of thread electrodes were estimated using electrochemical methods. Potential of platinum black electrodeposited thread as 3-D electrodes for creating high gradient electrical field for dielectrophoretic assembly of microspheres and Saccharomyces

cerevisiae (yeast cells) into 1D and two-dimensional structures over long ranges under the application of low voltages (4–10 Vpp) has been demonstrated. The formation of highly ordered pearl chains of microparticles using thread electrodes when subjected to dielectrophoresis(DEP) has been discussed in detail.

Honors and Awards

Ranked 760th Among Approximately 400,000 Participants
Nationwide University Entrance Exam for B.Sc
2008

Member of Exceptional Talents Center
2008

Established to Support Students with Highest Intellectual Abilities and Outstanding Academic Records

Ranked 180th Among Approximately 10000 Participants
Nationwide university entrance exam for M.Sc
2012

Ranked 2nd Student in Energy Conversion Among 29 students
2014

ASME Conference Reviewer
ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting and 12th International Conference on Nanochannels, Microchannels, and Minichannels
February 2014

Test Scores

TOEFL iBT
October 2014 Score:96/120

Reading : 28
Listening : 21
Speaking : 24
Writing : 23

MS Average Grade
Score:17.98/20 (Top 5%)

BS Average Grade
Score:16.19/20

High School Final Exam
January 2008 Score:19.36

Volunteer Experience

Member at Fars Nature Cleaners (#### ##### #######)
April 2014 - Present

Amin Mansoorifar

Research Assistant at Southern Methodist University

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Contact Amin on LinkedIn