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Website : <http://sites.google.com/site/apsasmito>
Publications : 2 books, 3 book chapters, 15 journals,
1 keynote, 14 conferences
H-index : 2 (ISI Web of Science) / 3 (Google
Scholar)



Educational Background

- **Ph.D.** Division of Energy and Bio-Thermal System, Mechanical Engineering Department, National University of Singapore, 2008-2010. Supervisor: Prof. Arun S. Mujumdar, Co-supervisor: Asst. Prof. Erik Birgersson; research project: Modeling of Transport Phenomena in Polymer Electrolyte Fuel Cell Stacks: Thermal, Water, and Gas Management; scholarship awarded from NUS Research Scholarship and AUN/SEED-Net.
- **B.Eng. (Hons).** Engineering Physics Department, Gadjah Mada University, Indonesia, 2001-2005. Academic advisor: Dr.-Ing. Kusnanto, thesis supervisor: Dr.-Ing. Sihana and Drs. Ir. Masjhuri, MM; thesis: Improved Design for Non-Condensable Gas Removal System in Dieng Geothermal Power Plant: Ejector and Liquid Ring Vacuum Pump.

Research Interest

- New and renewable energy
- Fuel cell modeling
- Total air-conditioning in underground mines
- Heat and mass transfer
- Drying technology
- Micro-mixer and micro-reactor
- Phase change materials
- Nanofluids and heat transfer enhancement
- Heat and mass transfer in coils
- Industrial transport processes
- Two-phase flow in plain and porous media
- Applications of computational fluid dynamics

Teaching Interest

- Heat and mass transfer
- Transport phenomena
- Thermodynamics
- Computational fluid dynamics

- Fuel cell technology
- Drying technology

Publications:

Books:

1. **A.P. Sasmito** and A.S. Mujumdar, Transport Phenomena Models for Polymer Electrolyte Fuel Cell Stacks: Thermal, Water and Gas Management - From Fundamentals to Applications, *Lambert Academic Publishing*, Germany, 2011, ISBN: 978-3-8443-9063-6.
2. **A.P. Sasmito**, J.C. Kurnia, S.V. Jangam, Mathematical Modeling of Transport Processes, *TPR Group*, Singapore, 2011, ISBN: 978-981-08-9179-4.

Book chapters:

1. **A.P. Sasmito**, S.A. Khan, A.S. Mujumdar, Nanofluids Heat Transfer: Preparation, Characterization and Theoretical Aspects, book chapter in: Nanofluids: Research, Development and Applications, edited by Y. Zhang, *Nova Science Publishers, Inc.*, Hauppauge, NY, 2012, in progress.
2. **A.P. Sasmito** and A.S. Mujumdar, Mass Transport in a Micro-Channel T-Junction with Coiled-Base Channel Design, Lecture notes in: Selected Topics in Heat and Mass Transport, *TPR group*, Singapore, 2011.
3. **A.P. Sasmito**, E. Birgersson, A.S. Mujumdar, Mathematical Modeling of PEM Fuel Cell Stacks: Thermal Management, book chapter in: Mathematical Modeling of Industrial Transport Processes, edited by P. Xu, Z. Wu and A. S. Mujumdar, *TPR group*, Singapore, 2009, ISBN: 978-981-08-6269-5.

Journals:

1. J.C. Kurnia, **A.P. Sasmito**, S.V. Jangam, A.S. Mujumdar, Heat Transfer in Coiled Square Tubes for Laminar Flow of a Slurry of Microencapsulated Phase Change Material (MEPCM), *Heat Transfer Engineering*, 2011, under review.
2. A.V. Arasu, **A.P. Sasmito**, A.S. Mujumdar, Thermal Performance Enhancement of Paraffin Wax with Al₂O₃ and CuO Nanoparticles – A Numerical Study, *Frontier in Heat and Mass Transfer*, 2011, under review.
3. A.V. Arasu, **A.P. Sasmito**, A.S. Mujumdar, Numerical Study of Performance of paraffin wax dispersed with Alumina in a concentric pipe latent heat storage system, *Thermal Science*, 2011, under review.
4. **A.P. Sasmito** and A.S. Mujumdar, Numerical Evaluation of Various Thermal Management Strategies for Polymer Electrolyte Fuel Cell Stacks, *International Journal of Hydrogen Energy*, 2011, under review.
5. **A.P. Sasmito** and A.S. Mujumdar, A Novel Flow Reversal Concept for Improved Thermal Management in Polymer Electrolyte Fuel Cell Stacks, *International Journal of Thermal Sciences*, 2011, under review.

6. **A.P. Sasmito**, E. Birgersson, K.W. Lum, A.S. Mujumdar, Fan Selection and Stack Design for Open-Cathode Polymer Electrolyte Fuel Cell Stacks, *Renewable Energy*, 2011, accepted.
7. **A.P. Sasmito** and A.S. Mujumdar, Performance Evaluation of a Polymer Electrolyte Fuel Cell with a Dead-End Anode: A Computational Fluid Dynamic Study, *International Journal of Hydrogen Energy*, 2011, in press, DOI: 10.1016/j.ijhydene.2011.05.171.
8. **A.P. Sasmito**, J.C. Kurnia, A.S. Mujumdar, Numerical Evaluation of Transport Phenomena in a T-junction Micro-reactor with Coils of Different Configurations, *Industrial Engineering Chemistry Research*, 2011, in press, DOI: 10.1021/ie200139s.
9. J.C. Kurnia, **A.P. Sasmito**, A.S. Mujumdar, Laminar Convective Heat Transfer for In-plane Spiral Coils of Non-circular Cross Sections Ducts: A Computational Fluid Dynamics Study, *Thermal Science*, 2011, in press, DOI: 10.2298/TSCI100627014K.
10. **A.P. Sasmito**, J.C. Kurnia, A.S. Mujumdar, Numerical Evaluation of Laminar Heat Transfer Enhancement in Nanofluid Flow in Coiled Square Tubes, *Nanoscale Research Letters*, 2011, Vol 6: 376.
11. J.C. Kurnia, **A.P. Sasmito**, A.S. Mujumdar, Numerical Investigation of Laminar Heat Transfer Performance of Various Cooling Channel Designs, *Applied Thermal Engineering*, 2011, Vol 31 (6-7): 1293-1304.
12. J.C. Kurnia, **A.P. Sasmito**, A.S. Mujumdar, Evaluation of Heat Transfer Performance of Helical Coils of Non-circular Tubes, *Journal of Zhejiang University Science: A*, 2011, Vol 12 (1): 63-70.
13. **A.P. Sasmito**, E. Birgersson, A.S. Mujumdar, Numerical Investigation of Liquid Water Cooling for a Proton Exchange Membrane Fuel Cell Stack, *Heat Transfer Engineering*, 2011, Vol 32 (2): 151-167.
14. **A.P. Sasmito**, K.W. Lum, E. Birgersson, A.S. Mujumdar, Computational Study of Forced-Air Convection in an Open-Cathode Polymer Electrolyte Fuel Cells Stack, *Journal of Power Sources*, 2010, Vol 195 (17): 5550-5563.
15. H. Ly, E. Birgersson, M. Vynnycky, **A.P. Sasmito**, Validated Reduction and Accelerated Numerical Computation of a Model for the Proton Exchange Membrane Fuel Cell, *Journal of the Electrochemical Society*, 2009, Vol 156 (10): B1156-B1168.

Invited Presentation:

1. **A.P. Sasmito**, E. Birgersson, A.S. Mujumdar, Fuel Cell Research and Development Using ANSYS FLUENT – From Fundamentals to Applications, 8th ASEAN ANSYS Conference, Singapore, 2010.

Conferences:

1. **A.P. Sasmito**, E. Birgersson, H. Ly, K.W. Lum, A.S. Mujumdar, Improved Total Air-conditioning System in Underground Coal Mines–A Computational Study, 22nd World Mining Congress and EXPO, Turkey, 2011.
2. J.C. Kurnia, **A.P. Sasmito**, S.V. Jangam, A.S. Mujumdar, Model for Drying of Thin Slabs Using Pulsed Impinging Jets, 7th Asia-Pacific Drying Conference, Tianjin, China, 2011

3. J.C. Kurnia, **A.P. Sasmito**, A.S. Mujumdar, Computational Study of Energy-Efficient Thermal Drying Using Intermittent Impinging Jets, *8th ASEAN ANSYS Conference*, Singapore, 2010.
4. J.C. Kurnia, **A.P. Sasmito**, A.S. Mujumdar, Numerical Evaluation of Heat Transfer Performance of Helical Coils of Non-circular Tubes, *International Symposium on Innovative Materials for Processes in Energy Systems (IMPRES)*, Singapore, 2010.
5. J.C. Kurnia, **A.P. Sasmito**, A.S. Mujumdar, Convective Heat Transfer in Coils of Non-circular Cross-sections: CFD Study of Laminar Heat Transfer Enhancement Relative to Straight Pipes, *Sriwijaya International Seminar on Energy Science and Technology (SISEST)*, Palembang, Indonesia, 2010.
6. **A.P. Sasmito**, E. Birgersson, K.W. Lum, A.S. Mujumdar, Numerical Study of Natural Convection Air Cooling of a Polymer Electrolyte Fuel Cell: Single Cell and Stack, *Regional Conference on Mechanical and Aerospace Technology*, p. 114, Bali, Indonesia, 2010.
7. **A.P. Sasmito**, E. Birgersson, A.S. Mujumdar, Transient Analysis of a PEFC with a Dead-End Anode, *216th Electrochemical Society Meeting 2009*, p. B1-320, Vienna, Austria, 2009.
8. **A.P. Sasmito**, E. Birgersson, A.S. Mujumdar, Analysis of Various Cooling Strategies for a PEFC stack, *216th Electrochemical Society Meeting 2009*, p. B1-321, Vienna, Austria, 2009.
9. **A.P. Sasmito**, E. Birgersson, A.S. Mujumdar, Fuel Cell Stack: Thermal Management, *Workshop on Mathematical Modeling on Minerals, Metals, and Materials Processing*, Singapore, 2009.
10. **A.P. Sasmito**, E. Birgersson, A.S. Mujumdar, Framework for Modelling and Design of PEMFC Stacks with FLUENT, *7th ASEAN ANSYS Conference*, Singapore, 2008.
11. K.W. Lum, E. Birgersson, **A.P. Sasmito**, H.J. Poh, A.S. Mujumdar, Numerical Study of Forced Air Convection for Polymer Electrolyte Fuel Cell Stacks, *213th Electrochemical Society Meeting 2008*, p. B8-486, Phoenix Arizona, United States of America, 2008.
12. **A.P. Sasmito**, E. Birgersson, A.S. Mujumdar, Numerical Investigation of PEMFC Stack Cooling, *6th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT 2008)*, p. SA4, Pretoria, South Africa, 2008. (selected for publication in *Heat Transfer Engineering*).
13. **A.P. Sasmito**, E. Birgersson, A.S. Mujumdar, Implementation and Validation of a CFD Model for PEMFC with a Net-Type Flow Field, *6th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT 2008)*, p. SA3, Pretoria, South Africa, 2008.
14. **A.P. Sasmito**, E. Birgersson, A.S. Mujumdar, Quantitative Comparison On the Effect of Net-Type Flow Gas Distributor on PEMFC Performance, *10th AUN/SEED-Net Field Wise Seminar on Mechanical Engineering - New and Renewable Energy*, Bandung, Indonesia, 2007.

Research experiences:

1. *Modeling of transport phenomena in polymer electrolyte fuel cell stacks:*
 - Fundamental research: model development (two-phase model comprising conservation of mass, momentum, energy, species, charge, phenomenological membrane model and agglomerate catalyst layer mode); model verification, calibration and validation against experimental counterpart in term of global polarization curve, local current density and temperature distributions.
 - Applied research: thermal management (modeling of various thermal management strategies in PEFC stack, e.g. liquid, forced air-convection, edge-air, and natural convection-air cooling); water and gas management (transient analysis of PEFC with a dead-end anode and purging effect to the cell performance).
2. *Modeling and design of underground coal mines:*
 - Model development of underground coal mining ventilation.
 - Dust and methane control in underground coal mining
3. *Phase change materials:*
 - Model development of phase change material for thermal energy storage and electronic cooling
 - Improved design of phase change material for solar thermal energy storage.
4. *Micro-mixer and micro-reactor:*
 - Model development and validation of mixing processes and chemical reactions in micro channel reactor
 - Heat and mass transport enhancement in T-junction micro-reactor
5. *Heat transfer enhancement using nanofluid and micro-encapsulated phase change materials*
 - Model development of various nanofluid for heat transfer enhancement: single phase, Euler-Lagrange, Euler-Euler and mixture model.
 - Nano-fluid heat transfer in coiled-base channel.
 - Model development for MEPCM suspension for heat transfer enhancement
6. *Mathematical modeling of drying:*
 - Conjugate model for drying in porous media.
 - Effect of pulsation and intermittent inlet on drying of heat sensitive materials.
7. *Impinging jet heat and mass transfer:*
 - Mathematical modeling of jet impingement for improved heat and mass transfer in drying.
 - Effect of pulsating and intermittent flow in impinging jet heat transfer: laminar and turbulent.
8. *Heat transfer:*
 - Heat transfer in straight, coiled and helical duct in various shape and size: laminar, turbulent, various Re and Pr number, newtonian, non-newtonian fluid and nano-fluid for compact heat exchanger.
 - Modeling of heat transfer performance in coiled tubes.
9. *Geothermal energy (in collaboration with PT. Geodipa Energy, Indonesia):*
 - Energy analysis in geothermal power plant. Improved design for non-condensable gas removal system in geothermal power plant.
 - CFD simulation of nozzle design for a low pressure geothermal turbine.

Teaching experiences:

1. Guest lecture in *Mass Transport* (ME6203), **Ph.D. course**, Mechanical Engineering Department, National University of Singapore, 2011.
2. Teaching assistance in *Power Generation and Optimization* (TKF3421), **B.Eng specialization course**, Engineering Physics Department, Gadjah Mada University, 2004.

Thesis Supervisions:

1. **Ong Zhao Fu Amos**, Design of Solar Thermal Energy Storage in a Phase Change Materials, *Undergraduate thesis*, Department of Mechanical Engineering, National University of Singapore, 2010-2011.
2. **Lee Cheow Beng Kenny**, Modeling and design of coal mines, *Undergraduate thesis*, Department of Mechanical Engineering, National University of Singapore, 2010-2011.
3. **Seah Kah Wei**, Study of Forced-air convection in PEMFC stacks, *Undergraduate thesis*, Department of Mechanical Engineering, National University of Singapore, 2009-2010.
4. **Swaminathan Kannapan**, Development of a Fuel Cell Model in Fluent, *Undergraduate thesis*, Department of Mechanical Engineering, National University of Singapore, 2008-2009.
5. **Tri Gunadi Widjaja**, High Performance Computing of Two-Phase Flow in a Fuel Cell, *Undergraduate thesis*, Department of Mechanical Engineering, National University of Singapore, 2008-2009.
6. **Kiara Ä. Kochendörfer**, Numerical study of PEMFC with a dead-end anode, *Diploma thesis*, Department of Chemical Engineering, Technische Universität Berlin, 2007-2008.
7. **Low Pei Shan Selina**, Numerical study of free-air breathing PEMFC, *Undergraduate thesis*, Department of Chemical and Bio-molecular Engineering, National University of Singapore, 2007-2008.
8. **Chung Pak Wing**, Numerical study of PEMFC stack design: parallel and series, *Undergraduate thesis*, Department of Electrical and Computer Engineering, National University of Singapore, 2007-2008.

Awards

- Top 10 percent student in Engineering Physics Department UGM.
- Master of Engineering scholarship in ME NUS from AUN/SEED-Net.
- Ph.D. scholarship in ME NUS from NUS research scholarship and AUN/SEED-Net.

Professional service as peer-reviewer in journals:

- Applied Energy (4)
- Applied Thermal Engineering (2, w/ Prof. A.S. Mujumdar and J.C. Kurnia)
- AIChE Journal (1, w/ Prof. A.S. Mujumdar and J.C. Kurnia)
- Brazilian Journal of Chemical Engineering (1, w/ Prof. A.S. Mujumdar)
- Chemical Engineering Research and Design (1, w/ Prof. A.S. Mujumdar)
- Chemical Engineering & Technology (1, w/ Prof. A.S. Mujumdar)

Curriculum Vitae

- Energy Conversion & Management (2, w/ Prof. A.S. Mujumdar)
- Heat Transfer Engineering (1, w/ Prof. A.S. Mujumdar)
- International Journal of Heat and Mass Transfer (3, w/ Prof. A.S. Mujumdar)
- International Journal of Thermal Sciences (18, w/ Prof. A.S. Mujumdar and J.C. Kurnia)
- Industrial & Engineering Chemistry Research (3, w/ Prof. A.S. Mujumdar)
- Journal of Zhejiang University Science A (1, w/ Prof. A.S. Mujumdar)
- Korean Journal of Chemical Engineering (1, w/ Prof. A.S. Mujumdar)
- Langmuir (1, w/ Prof. A.S. Mujumdar)
- Nanoscale Research Letters (3, w/ Prof. A.S. Mujumdar and J.C. Kurnia)
- Nanoscience and Nanotechnology Letters (1, w/ Prof. A.S. Mujumdar)
- Physics Letters A (1, w/ Prof. A.S. Mujumdar)
- Thermal Science (2, w/ Prof. A.S. Mujumdar)
- Zeitschrift fur Naturforschung A (1, w/ Prof. A.S. Mujumdar)

Post-graduate courses taken:

- *Solar Energy System*
 - Project: Design of hybrid solar system for a remote hospital.
- *Industrial Aerodynamics*
 - Project: Review of experimental study on the flow characteristic in industrial wind tunnels.
- *Thermal System Design*
 - Project: Analysis of the industrial heat pump dryer.
- *Computational Fluid Mechanics*
 - Project 1: Mesh generation on NACA airfoil: algebraic, elliptic and smoothing functions.
 - Project 2: Two-dimensional lid-driven cavity flow simulation using second-order upwind finite volume method and generalized differential quadrature method.
- *Energy Engineering*
 - Project: Application of non-linear programming for energy-mix supply optimization.
- *Mechanical Engineering Oil and Gas Technology*
 - Project 1: Review of sub-sea processing in mechanical engineering oil and gas technology.
 - Project 2: Analysis of multi-phase pump in sub-sea system.
- *Convective Heat Transfer* (seat in)
 - Project 1: Numerical study of convective heat transfer in a square duct: laminar; turbulent; pulsating inlet; buoyancy effect; newtonian and non-newtonian fluid; flat, convergence, and divergence channel, nanofluid.
 - Project 2: Mathematical modeling of drying: parallel flow and jet impingement.
- *Mass Transport* (seat in)
- *Advanced Transport Phenomena* (seat in)
- *Advanced Fluid Transients Computation and Modelling* (seat in)

Software skills:

- Gambit, Fluent + UDS + UDF's, C/C++ (expert)
- Comsol multiphysics, Matlab, Fortran, Tecplot (advanced)
- Office, LaTeX, Visio (expert)

Referees:

- **Prof. Arun S. Mujumdar:** Professor in Mechanical Engineering Department and Director of Minerals Metals and Materials Technology Centre (M3TC) National University of Singapore, Editor-in-Chief of Drying Technology - An International Journal published by Taylor & Francis.
 - Email : mpeasm@nus.edu.sg
 - Website : <http://serve.me.nus.edu.sg/arun/>
- **Asst. Prof. Erik Birgersson:** Assistant Professor in Department of Chemical and Bio-Molecular Engineering, National University of Singapore.
 - Email : chebke@nus.edu.sg
 - Website : http://www.chee.nus.edu.sg/people/faculty_birgersson.html
- **Dr.-Ing. Sihana:** Senior Lecturer and Head of Department of Engineering Physics, Gadjah Mada University, Indonesia.
 - Email : sihana@ugm.ac.id
 - Website : <http://sihana.staff.ugm.ac.id/>