

Irza Sukmana

Personal Details:

Nationality: Indonesian

Languages: Bahasa Indonesian, English (active) and Deutsch (passive)

Contact:

Bioengineering and Biophysics Lab

Department of Chemical and Biotechnological Engineering

Faculty of Engineering, University of Sherbrooke

2500 University Boulevard; Sherbrooke, Quebec, Canada J1K 2R1

Phone: +1-819-821-8000 ext 63162

Fax: +1-819-821-7955

Email: Irza.Sukmana@USherbrooke.ca

Web: http://www.chimique.usherbrooke.ca/Biogenie/index_a.htm



Permanent Address:

Advanced Engineering Materials and Biomaterial Research Group (AEMBRG)

Department of Mechanical Engineering, Faculty of Engineering, University of Lampung

Jalan Prof. Soemantri Brojonegoro 1

Bandar Lampung 35143, Indonesia

Phone: +62-721-704 947

Fax: +62-721-704 947

Email: iskmana@yahoo.com

Web: <http://www.unila.ac.id/~ft-mesin/>

RESEARCH OBJECTIVE

Earlier in my career in Indonesia, I have worked in the field of mechanical and materials engineering, including the optimization of production process, friction stir welding (FSW) and corrosion engineering and preventions. The results were published in several national accredited journals in Indonesia.

My core research interest now is chemical and biotechnological engineering, with a speciality on biomaterials and tissue engineering. During my doctorate study, I have developed a tridimensional (3D) culture system for the guidance of human umbilical vein cells (HUVECs) for the promotion of oriented microvessel formations. This research project was designed to constitute the initial part of a larger research program aiming to create an artificial blood microvessel network within tridimensional tissues scaffolds.

My interdisciplinary educational backgrounds have allowed me to work in different fields of research, including mechanical engineering, advance engineering materials, biomaterials, biomechanics and biomedical engineering.

EDUCATIONS

University of Sherbrooke, Quebec, Canada

PhD Research in Chemical and Biotechnological Engineering (January 2007 – 2010).

Thesis: Development of a tridimensional cell culture system to orient microvessel formation

Supervisor: Professor Patrick VERMETTE (e-mail: Patrick.Vermette@USherbrooke.ca)

During my Ph.D. study,

- I have been using a number of imaging techniques in order to characterize and evaluate the development of oriented microvessel, including phase contrast, fluorescence and confocal microscopy. Furthermore, to proof the existence of multi-cellular lumen, I have using immunohistochemical sections and analysis as well as utilizing a fluorescence fibrin matrix.
- Furthermore, I have also been taking part on the development of a simple set-up bioreactor and automated bioreactor system for 3D cell culture. Those reactors are dedicated to evaluate the biomechanics and biofluidics phenomena during the development of artificial blood microvessels.

Institute of Technology Bandung, West Java, Indonesia

M.T. (Master's degree) in Material Engineering from Mechanical Engineering Department (1998-2001).

Thesis: Research of stress corrosion cracking of austenitic stainless steel AISI 304 with U-Bend method at room temperature and chloride environment.

Supervisors: Prof.Rochim SURATMAN (r_suratman@lycos.com), DR.Bambang WIDYANTO (bambwid@cbn.net.id)

Institute of Technology Bandung, West Java, Indonesia

S.T. (Bachelor degree) in Production Engineering from Mechanical Engineering Department (1989-1996).

Thesis: Research on the surface roughness optimization for grinding process of the tool steel.

Supervisor: Professor Taufiq ROCHIM (fieq_mpe@yahoo.com)

SCHOLARSHIPS AND AWARDS

- Student travels grant from Department of Chemical and Biotechnological Engineering, University of Sherbrooke to visit The World Conference on Regenerative Medicine in Leipzig, Germany 29-31 October 2009 (507 CA\$).
- Graduate Award from Quebec Network for Research on Aging (RQRV) to visit The World Conference on Regenerative Medicine in Leipzig, Germany 29-31 October 2009 (1000 CA\$).
- Merit Scholarship Program for Ph.D. study from Islamic Development Bank (IDB), Jeddah, Saudi Arabia, from January 2007 to June 2010 (3 years and 6 months).
- Friendship program scholarship from Japan International Cooperation Agency (JICA) in the field of small-size and medium enterprises (SMEs) at Numazu City, Japan. Held from January to February 2001 (2 months).
- EEDP (Engineering Education Development Project) Scholarship for Master study from DGHE – Indonesia in cooperation with JICA. Held from September 1998 for two years period.
- Professional training scholarship for consultant of SMEs in development countries from *Carl Duisberg Gessellschaft* (CDG) in cooperation with Federal Ministry of Germany for Economic Cooperation and Development (BMZ), from June 1996 to September 1997 (15 months). During this period, I have visited a numbers of different small-size industrial centers in Germany.

PUBLICATIONS

Peer-reviewed International Journals

- Sukmana, I. and Vermette, P. (2010) "The Effect of co-culture with fibroblasts and angiogenic growth factor on microvascular maturation and multi-cellular lumen formation in HUVEC-oriented polymer fibre constructs." *Biomaterials* **31**, pp. 5100-5109. DOI: 10.1016/j.biomaterials.2010.02.076. **Journal's Impact factor: 6.646.** <http://www.sciencedirect.com/science/journal/01429612>
- Sukmana, I and Vermette, P. (2010) "Polymer fibres as contact guidance to orient microvascularization in a 3D environment". *J.Biomed.Mater.Res.A* **92**, pp. 1587-1597. DOI: 10.1002/jbm.a.32479. **Journal's Impact factor: 2.706.** <http://www3.interscience.wiley.com/journal/122381455/abstract>
- Sukmana, I and Vermette, P. (2009) "Polymer monofilaments as a cellular guidance of angiogenesis development in three-dimensional environment" *Regenerative Medicine* **4 (6), Supplement 2**, pp. S292-S293 (Special edition for The World Conference on Regenerative Medicine). **Journal's Impact factor: 2.786.** <http://www.futuremedicine.com/toc/rme/4/6s>
- Sukmana, I and Vermette, P. "Vascularization strategies to engineer tissue substitutes: a challenge to support blood microvessel development". In the final preparation for submission to *Artificial Organs*. Journal's Impact factor: 2.131.

National Accredited Journals*

- Sukmana, I. (2007) "Friction Stir Welding as new emerging trend in joining technology for aluminum alloys". Journal TEKNIK (Engineering Faculty of STT Jakarta); Volume 10, Nomor 2, December 2007.
- Sukmana, I and Burhanuddin Y. (2007) "The effect of sensitization temperature on stress corrosion cracking of stainless steel AISI 304 in sulphate acid environment". Journal TEKNIK (Engineering Faculty, Brawijaya University); Volume 14 Nomor. 2, Agustus 2007.
- Sukmana, I. (2007) "The effect of force coefficient and specific energy parameters of face surface grinding for tool-steel VCN 150" (*in Indonesian language*). Journal POROS (Department of Mechanical Engineering, Tarumanagara University, Jakarta); Volume 10 Nomor 1, Januari 2007.

- Sukmana, I. (2006) "New emerging trend in the application of magnesium alloys: from mechanical to bioengineering". Journal TEKNIK (Engineering Faculty of STT Jakarta); Volume 9, Nomor 2, Desember 2006.
- Sukmana, I. (2006) "The atmospheric corrosion of pre-coated low carbon steel ST-30 in rural, city and industrial area at Lampung Province". Journal REKAYASA (Engineering Faculty of Mataram University); Volume 8 Nomor 2, Desember 2006.
- Sukmana, I. (2006) "Potentiality and drawback of the application of magnesium and its alloys in the automobile industry" Journal Kajian Teknologi (Engineering Faculty, Tarumanagara University; Volume/No: Mai 2006
- Sukmana, I. (2005) "Research on the optimization of face-surface grinding process of medium carbon steel JIS SS41" (*in Indonesian Language*). Journal POROS (Department of Mechanical Engineering, Tarumanagara University – Jakarta); Volume 8 No. 3, July 2005
- Sukmana, I. (2005) "Effect of Heat Input to the Spot Welding Quality on Welding Process of Connector at Automobile Battery". Journal POROS (Department of Mechanical Engineering, Tarumanagara University – Jakarta); Volume 8 No. 1, Januari 2005.
- Sukmana, I. (2004) "Research on marine corrosion phenomenon and its prevention method at service Point-D, Panjang Harbour (*in Indonesian language*). Journal POROS (Department of Mechanical Engineering Tarumanagara University – Jakarta; Volume 7 No. 3, July 2004.

**) Accredited by DGHE – Indonesia*

Conferences

- Sukmana, I. and Vermette, P. (2009) "Polymer monofilaments as a cellular guidance of angiogenesis development in three-dimensional environment". The World Conference on Regenerative Medicine. Leipzig, Germany, 29-31 October 2009 (Poster).
- Sukmana, I. (2009) "Three-dimensional culture system for angiogenesis guidance". International Conference on Biotechnology. Udayana University, Bali, Indonesia, 15-16 September 2009 (Poster).
- Sukmana, I. Glacial, F., Dubois, J., Chouinard, J. and Vermette, P. (2008) "Development of scaffolds and bioreactor to grow patterned microvessel networks". Annual Conference of Tissue Engineering and Regenerative Medicine Society North America (TERMIS-NA), San Diego, CA, 7-8 December 2008 (Poster).
- Sukmana, I (2004) "Magnesium alloys as a new trend in material development and its corrosion behaviors". International Collaboration Workshop between Keio University-Japan and Brawijaya University, Malang, Indonesia; Malang, 14-16 August 2004 (Invited speaker).

Course and Practicum Handouts **)

- Sukmana, I. (2005) "Corrosion Engineering". Mechanical Engineering Department, University of Lampung, December 2005.
- Sukmana, I. (2005) "Occupational Safety, Health and Assurance (OSHA)". Mechanical Engineering Department, University of Lampung, June 2005.
- Sukmana, I. (2005) "Welding technology". Mechanical Engineering Department, University of Lampung, June 2005.
- Harun, S and Sukmana, I (2004) "Lab Work Guidance for Practicum of Production Process I". Mechanical Engineering Department, University of Lampung, December 2004.
- Sukmana, I. (2004) "Lab Work Guidance for Practicum of Welding Techniques". Mechanical Engineering Department, University of Lampung, August 2004.
- Sukmana, I. (2004) "Engineering Entrepreneurship". Mechanical Engineering Department, University of Lampung, April 2004.

***)* Approved by the Research Institute (LP) of University of Lampung.

RESEARCH GRANT

- Educational Project: Entrepreneurship Course (as principal executor); Funded by: DGHE of Indonesia; FY 2004–2005; Total Fund: 14.500.000,00 IDR (Indonesian Rupiah); Status: finished on October 2005.
- Social Responsibility Project name: Management Training for motorcycles driver at Kampung Baru – Bandar Lampung (as principal executor); Funded by: DIKS - University of Lampung (UNILA); FY 2004–2005; Total Fund: 2.500.000,00 IDR; Status: finished on September 2005.
- Research Grant, Title: Study of Atmospheric Corrosion of Mild Steel on Rural, Industrial and Marine Site on

Lampung Province (as principal investigator); Funded by: DGHE of Indonesia; FY 2003–2004; Total Fund: 5.000.000,00 IDR; Status: finished on November 2004.

- Educational Project: Development of *Jominy* Testing Machine and Its Manual (as co-investigator); Funded by: Forum for Higher Education Development Services (HEDS); FY 2003 – 2004; Total Fund: 1.500.000,00 IDR; Status: Finish on August 2004.
- Educational Grant, Title: Preparing of Educational Material of Production Process I Course (as principal executor); Funded by: Forum for Higher Education Development Services (HEDS); FY 2003–2004; Total Fund: 650.000,00 IDR; Status: Finished on April 2004.
- Research Grant, Title: The Effect of Sensitization on Corrosion Resistance of Stainless Steel AISI 304 in Hydrochloric Acid Environment (as principal investigator); Funded by DGHE of Indonesia; FY 2002–2003; Total Fund: 5.000.000,00 IDR; Status: Finished on November 2003.
- Research Grant, Title: Penelitian Sistem Pengendalian Korosi dan Fenomena Korosi Air Laut di Dermaga Pelabuhan Panjang (as principal investigator); Funded by: DIKS-UNILA; FY 2002 – 2003; Total Fund: 2.000.000,00 IDR; Status: Finished on September 2003.

PROFESSIONAL AFFILIATION

- Quebec Network for Research on Aging (RQRV) as Graduate student member, since 2009 – present.
- Material Advantage as Student member since 2008 – present. Material Advantage is a unique membership for graduate student in North America to become a member in 4 different professional societies i.e., The American Ceramic Society (ACerS), Association for Iron & Steel Technology (AIST), ASM International, and The Minerals, Metals and Materials Society (TMS).
- Indonesian Corrosion Association as Personal member, since 2005-2006.

ACADEMIC EXPERIENCE

Before starting my Ph.D. study, I have had the opportunity to be solely responsible for teaching in different courses at the University of Lampung, Indonesia. The courses are including: production process, basic industrial management, welding process, entrepreneurship, engineering ethics, research methodology, and corrosion and preventions. As a lecturer, I obliged to prepare a syllabus and teaching materials. Therefore, I have published some course handouts. I have also supervised more than 10 undergraduate students and have been also invited as examiners for final research project of more than 20 undergraduate students.

Below is the resume of my academic experience.

State University of Lampung, Indonesia

- As senior lecturer since July 2005 – present
- In August 2005, I was honored as The Best Lecturer of The Faculty of Engineering, and as The Best Lecturer in The University of Lampung (awarded September 2005, 2nd winner).
- As Head of Assessment Project for the development of a non degree program (D2) in Department of Mechanical Engineering, University of Lampung, from July to December 2004 (6 months).
- As Head of Technology Mechanics Lab., Department of Mechanical Engineering, University of Lampung, from September 2002 to August 2005 (3 years).
- As academic supervisor (*Pembimbing akademik*) of 23 undergraduate students at Department of Mechanical Engineering, from September 2002 to August 2005 (3 years).
- As lecturer (*Ahli madya*) at Department of Mechanical Engineering, September 2002 to June 2005.
- As tutor assistant lecturer, Department of Mechanical Engineering, December 2001 to August 2002.

Sherbrooke, June 16, 2010



Irza Sukmana