

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

AMM&NS programme (AY 2009/2010)

Number of Research Projects with publications: 1 FRP and 5 IUPs

(* appeared in 2 or more projects)

(A) Collaborative Publications with SMA-MIT Fellows

(1) FRP: Advanced Materials and Nanotechnology on a Silicon Platform

Journal Publication

- *1 H Tanoto, SFYoon, KL Lew, WK Loke, C Dohrman, EA Fitzgerald and LJ Tang, "Electroluminescence and structural characteristics of InAs/In_{0.1}Ga_{0.9}As quantum dots grown on graded Si_{1-x}Ge_x/Si substrate", Applied Physics Letters, Published 7 October 2009, Vol.95, Iss 14, pp. 141905. (*also appeared in IUP-1*)
- *2 H Tanoto, SF Yoon, CY Ngo, C Dohrman, EA Fitzgerald, LH Tan and CH Tung, "Origin and suppression of V-shaped defects in the capping of self-assembled InAs quantum dots on graded Si_{1-x}Ge_x/Si substrate", Applied Physics Letters, Published 7 August 2009, Vol.95, pp. 052111. (*also appeared in IUP-1*)
- *3 L Zhang, JH Teng, SJ Chua and EA Fitzgerald, "Linearly polarized light emission from InGaN light emitting diode with subwavelength metallic nanograting", Applied Physics Letters Published 31 Dec 2009, Vol. 95, pp. 261110. (*also appeared in IUP-1*)
- 4 Jia Yun, Rui Wang, WK Choi, JTL Thong, CV Thompson, Mei Zhu, YL Foo and MH Hong, "Field emission from a large area of vertically-aligned carbon nanofibers with nanoscale tips and controlled spatial geometry", Carbon, Published April 2010, Vol. 48, Iss 5, pp. 1362-1368.
- 5 ST Boles, CKF Ho, KL Pey, EA Fitzgerald & CV Thompson, "Catalyst Proximity Effects on the Growth Rate of Si Nanowires", Journal of Applied Physics, Published 31 August 2009, Vol.106, pp.044311.
- 6 TK Ng, SF Yoon, KH Tan, KP Chen, H Tanoto, KL Lew, S Wicaksono, WK Loke, C Dohrman and EA Fitzgerald, "Molecular beam epitaxy growth of bulk GaNAsSb on Ge/graded-SiGe/Si substrate", Journal of Crystal Growth, Published 15 March 2009, Vol. 311, Iss 7, pp. 1754-1757
- *7 Wang Miao, SJ Chua, H Gao, JS Leib and CV Thompson, "A Study on Morphology Control of ZnO Electrodeposited on Au Surface", Journal of the Electrochemical Society, Published 1 October 2009, Vol. 156, Iss 11, pp. D517-D520. (*also appeared in IUP-1*)
- 8 Chan Hoe Yip, CC Wong & Yet-Ming Chiang, "Optical Absorption in a Finite three-dimensional Photonic Crystal Thin Film Solar Cell", Journal of the Optical Society of America B, Published 14 April 2010, Vol. 27, No. 5, pp. 920-926.
- 9 Chan Hoe Yip, Yet-Ming Chiang & CC Wong, "Addition : Dielectric Band Edge Enhancement of Energy Conversion Efficiency in Photonic Crystal Dye-Sensitized Solar Cell", Journal Physical Chemistry C, Published 4 January 2010, Vol. 114, Iss 3, pp. 1733-1734.
- 10 KW Tan, YK Koh, Y M Chiang & CC Wong, "Particulate Mobility in Vertical Deposition of Attractive Monolayer Colloidal Crystals", Langmuir, Published 25 January 2010, Vol. 26, Iss 10, pp. 7093-7100.
- 11 HJ Zhang, RJ Barsotti, CL Won ,XJ Xue, XG Liu, F Stellacci & JTL Thong, "Polymer-Protected Sub-2-nm-Nanogap Fabrication for Biological Sensing in Near-Physiological Conditions", Small, Published 2009, Vol.5, Iss 24, pp. 2797-2801.
- 12 QF Yan, Pavan Nukala, Yet-Ming Chiang & CC Wong," Three-Dimensional Metallic Opals Fabricated by Double Templating", Thin Solid Films, Published 1 July 2009, Vol. 517, Iss 17, pp. 5166-5171.

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SMA-2 PUBLICATIONS

- 13 HG Chew, F Zheng, WK Choi, WK Chim, EA Fitzgerald and YL Foo, "Comparison of the Synthesis of Ge Nanocrystals in Hafnium Aluminum Oxide and Silicon Oxide Matrices:", Journal of Nanoscience and Nanotechnology, Published February 2009, Vol 9, Iss 2, pp. 1577-1581.

Conference Publication

- *1 WK Choi, TH Liew, Y Jia, MK Dawood, CV Thompson, Y Wang, HI Smith & MH Hong, "Creation of Nano Structures with Interference Lithography" International Conference on Materials for Advanced Technologies, June 2009, Singapore 2009. (*also appeared in IUP-5*).
- 2 L Zhang, SJ Chua and EA Fitzgerald, "Linearly polarized InGaN light emitting diode with sub-wavelength metallic nanograting", 4th MRS-S Conference on Advanced Materials, Mar 2010, Singapore 2010.
- 3 M Wang, SJ Chua & CV Thompson, "Metal Oxides Nanostructures: Synthesis Properties and Applications, "Synthesis and properties of ZnO nanotube arrays and ZnO/TiO₂ composite structures by atomic layer deposition", EMRS Spring Meeting, Mar 2009.
- 4 L Zhang, SJ Chua and EA Fitzgerald, "Polarized InGaN LED by subwavelength metallic nanograting", 2nd International Conference on Metamaterials, Feb 2010, Egypt.
- 5 V Sharma, D Xia, W Craig Carter, Y-M Chiang and CC Wong, "Self-Assembly of 3D Non Close-Packed Colloidal Structures", American Physical Society March Meeting 2010, Mar 2010, Singapore 2010.
- *6 CV Thompson, AL Geirman, D Kim, J Ye, WK Choi, TH Liew, Y Wang, YJ Oh & CA Ross, "Solid-State Dewetting of Films as a Route to Ordered Nanostructures" International Conference on Materials for Advanced Technologies, June 2009, Singapore 2009. (*also appeared in IUP-5*)

(2) IUP-1: Lattice-Mismatched Materials

Journal Publication

- *1 H Tanoto, SFYoon, KL Lew, WK Loke, C Dohrman, EA Fitzgerald and LJ Tang, "Electroluminescence and structural characteristics of InAs/In_{0.1}Ga_{0.9}As quantum dots grown on graded Si_{1-x}Ge_x/Si substrate", Applied Physics Letters, Published 7 October 2009, Vol.95, Iss 14, pp. 141905. (*also appeared in FRP*)
- *2 H Tanoto, SF Yoon, CY Ngo, C Dohrman, EA Fitzgerald, LH Tan and CH Tung, "Origin and suppression of V-shaped defects in the capping of self-assembled InAs quantum dots on graded Si_{1-x}Ge_x/Si substrate", Applied Physics Letters, Published 7 August 2009, Vol.95, pp. 052111. (*also appeared in FRP*)
- *3 L Zhang, JH Teng, SJ Chua and EA Fitzgerald, "Linearly polarized light emission from InGaN light emitting diode with subwavelength metallic nanograting", Applied Physics Letters, Published 31 Dec 2009, Vol. 95, pp. 261110. (*also appeared in FRP*)
- *4 Wang Miao, SJ Chua, H Gao, JS Leib and CV Thompson, "A Study on Morphology Control of ZnO Electrodeposited on Au Surface", Journal of the Electrochemical Society", Published 1 October 2009, Vol. 156, Iss 11, pp. D517-D520. (*also appeared in FRP*)
- 5 Liang. Zhang, Jinghua Teng, Soo Jin Chua, Eugene. A. Fitzgerald, "Design and fabrication of subwavelength nanogratings based light-emitting diodes", Applied Physics B, Submitted 2009.
- 6 Liang. Zhang, Bing Wang, Jinghua Teng, Chan Choy Chum, Norman Soo Seng Ang, Ming Sheng Zhang, Soo Jin Chua, Eugene. A. Fitzgerald, "Plasmonic nano-grating integrated visible light-emitting diodes", Optics Express, Submitted 2009.

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SMA-2 PUBLICATIONS

(3) IUP-3: Integrated MRAM

Journal Publication

- 1 Y. Ren, A.O Adeyeye, C. Nam and C.A. Ross, "Effects of Interlayer Coupling in Elongated Ni₈₀Fe₂₀/Au/Co Nanorings", IEEE Transactions on Magnetism, Published June 2010, Vol. 46, No. 6, pp. 1906-1909.

(4) IUP-4: Nanomechanisms Ultra-Fine-Scale Structures and Living Cells

Journal Publication

- 1 M. Diez-Silva, M. Dao, J.Y. Han, C.T. Lim. and S. Suresh, "Shape and Biomechanical Characteristics of Human Red Blood Cells in Health and Disease", MRS Bulletin, Published May 2010, Vol. 35, No. 5, pp. 382-388.

(5) IUP-5: Synthesis & Stress Study of Nanocrystals Formed in a Confined Space

Conference Publication

- *1 WK Choi, TH Liew, Y Jia, MK Dawood, CV Thompson, Y Wang, HI Smith & MH Hong, "Creation of Nano Structures with Interference Lithography" International Conference on Materials for Advanced Technologies, June 2009, Singapore 2009. (*also appeared in FRP*)
- *2 CV Thompson, AL Geirman, D Kim, J Ye, WK Choi, TH Liew, Y Wang, YJ Oh & CA Ross, "Solid-State Dewetting of Films as a Route to Ordered Nanostructures" International Conference on Materials for Advanced Technologies, June 2009, Singapore 2009. (*also appeared in FRP*)

(6) IUP-6: Enabling Materials Technology for 3D IC's and heterogeneous Systems

Conference Publication

- 1 W.A. Sasangka, C.L. Gan, C.V. Thompson, W.K. Choi and J. Wei, "Effect of Bonding and Aging Temperatures on Bond Strengths of Cu with 75Sn25In Solders", in Proceedings of the 11th Electronics Packaging Technology Conference, Dec 2009, Singapore 2009.

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SMA-2 PUBLICATIONS

AMM&NS programme (AY 2009/2010)

(B) Non-collaborative Publications

(1) FRP: Advanced Materials and Nanotechnology on a Silicon Platform

Journal Publication

- *1 Shih-Wei Chang, Vivian P. Chuang, Steven T Boles, Caroline A Ross, and Carl V Thompson, "Densely-packed arrays of ultrahigh-aspect-ratio silicon nanowire fabricated using block copolymer lithography and metal-assisted etching", *Advanced Functional Materials*, Published 10 August 2009, Vol. 19, Iss 15, pp. 2495-2500. (*also appeared in IUP-5*)
- 2 Gilbert D Nessim, D Acquaviva, M Seita, KP O'Brien, CV Thompson, "The critical role of the underlayer material and thickness in growth vertically aligned carbon nanotubes and nanofibers on metal substrates by chemical vapor deposition", *Advanced Functional Materials*, Published 23 April 2010, Vol. 20, Iss 8, pp.1306-1312.
- 3 Vivian P Chuang, Caroline A Ross, Jessica Gwyther, and Ian Manners, "Self-Assembled Nanoscale Ring Arrays from a Polystyrene-b-polyferrocenylsilane-b-poly(2-vinylpyridine) Triblock Terpolymer Thin Film", *Advanced Materials*, Published 5 October 2010, Vol. 21, Iss 37, pp. 3789-3793.
- 4 Shiwei Chang, J Oh, ST Boles & CV Thompson, "Fabrication of silicon nanopillar-based nnaocapacitor arrays", *Applied Physics Letters*, Published 15 April 2010, Vol.96, Iss 15, pp. 153108.
- 5 JF Liu & EA Fitzgerald, "Efficient above-band-gap light emission in germanium", *Chinese Optics Letters*, Published 10 April 2009, Vol. 7, No. 4, p.271.
- 6 Lia Agustine Herman, Chan Hoe Yip & Chee Cheong Wong, "Opaline Backreflector Coating in Dye Sensitized Solar Cell", *Journal of Nanoscience and Nanotechnology*, Published July 2010, Vol. 10, No. 7, pp. 4657-4662.
- 7 MK Dawood, TH Liew, P Lianto, MH Hong, S Tripathy, JTL Thong and WK Choi, "Interference lithographically defined and catalytically etched large area silicon nanocones from nanowires", *Nanotechnology*, Published 21 May 2010, Vol. 21, No. 20, p. 205305.
- 8 NE Singh-Miller & N Marzari, "Surface energies, work functions, and surface relaxations of low index metallic surfaces from first-principles", *Physical Review B*, Published 7 Dec 2009, Vol. 80, Iss 23, pp. 235407-9.
- 9 Y Astier, O Uzun & F Stellacci, "Electrophysiological Study of Single Gold Nanoparticle/alpha-Hemolysin Complex Formation: A Nanotool to Slow Down ssDNA Through the alpha-Hemolysin Nanopore", *Small*, Published 2009, Vol. 5, Iss 11, pp. 1273-1278.
- 10 Joel KW Yang, Yeon Sik Jung, Jae-Byum Chang, Caroline A Ross, and Karl K Berggren, "Programmable Self-Assembly of Complex Nanoscale Patterns", *Nature Nanotechnology*, Submitted 2010.

Conference Publication

- 1 Kwan Wee Tan & CC Wong, "Dynamic Ordering of Attractive Colloidal Nanostructures", 5th International Conference on Technological Advances of Thin Films & Surface Coatings, July 2010, Singapore 2008.
- 2 Xiu Wang, Chan-Hoe Yip & CC Wong, "Nanostructured TiO₂ as blocking layer for Dye-sensitized solar cells", 5th International Conference on Technological Advances of Thin Films & Surface Coatings, July 2010, Singapore 2008.
- 3 V P Chuang, C A Ross, J Gwyther & I Manners, "Self-Assembled Surface Patterns From Organometallic Triblock polymer", *American Physical Society*, March 2009, Pittsburgh.

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SMA-2 PUBLICATIONS

- 4 N E Singh-Miller & N Marzari, "Wannier-functions disentanglement to determine Schottky barrier heights: applications to CNT-metal systems", APS March Meeting, Pittsburgh, March 2009, US.

(2) IUP-1: Lattice-Mismatched Materials

Journal Publication

- 1 Su-Zi Deng, Hai-Ming Fan, Miao Wang, Min-Rui Zheng, Jia-Bao Yi, Rong-Qin Wu, Hui-Ru Tan, Chong-Haur Sow, Jun Deng, Yuan-Ping Feng, and Kian-Ping Loh, "Thiol-Capped ZnO Nanowire/Nanotube Arrays with Tunable Magnetic Properties at Room Temperature", ACS Nano, Published 22 Dec 2009, Vol. 4, No. 1, pp. 495-505.
- 2 Zhang L, Xin MQ, Teng TJ & Chua SJ, "Photonic band structure of nanoporous anodized aluminum oxide with radius-to-period ratio modulation", Computational Materials Science, Published July 2010, Vol. 49, Iss 1, pp. S153-S156.
- 3 Jiqiang Ning, Shijie Xu, Rongxin Wang, Fan Zhang, HongQuang Le & Soo Jin Chua, "Correlated Band-Edge Emissions of ZnO Nanorods and GaN underlying Substrate", Japanese Journal of Applied Physics, Published 20 Feb 2009, Vol. 48, pp. 021102-4.
- 4 Soh CB, W Liu, SJ Chua, NSS Ang, AM Yong, SC Lai & JH Teng, "Stress relaxed nanoepitaxy GaN for growth of phosphor-free indium-rich nanostructures incorporated in apple-white LEDs", Physica Status Solidi A, Published June 2010, Vol. 207, No. 6, pp. 1400-1403.
- 5 K.P.Lim, H.T.Pham, S.F.Yoon, A.Markwitz and N.Yakovlev, "Growth temperature and plasma power effects on N incorporation in InSbN grown by molecular beam epitaxy", Physica Status Solidi, Rapid Research Letters, Published October 2009, Vol.3, No.7-8, pp.263- 265.

Conference Publication

- 1 S.F.Yoon, "III-V/Si integration: Potential and outlook for integrated low power micro and nanosystems", CASES Conference, Grenoble, France, 12 October 2009.
- 2 S.F.Yoon, "Photons for information representation and communication: An intersection between materials and device innovations", Symposium on Transformation Information Engineering and Science, Nanyang Technological University, 28-29 January 2010.

(3) IUP-3: Integrated MRAM

Conference Publication

- 1 Adeyeye, "Magnetic Nanostructures for Ultra-high Density Storage and Non-volatile Memory Applications" (KEYNOTE) at the 5th International Conference of the African-Materials Research Society, Sheraton Hotel & Towers, Abuja, Nigeria, from December 14th – 18th, 2009.
- 2 Ross, "Magnetic ring devices for memory and logic", Indo-US Workshop on Advanced Magnetic Materials and their Applications, Mar 2009, IIT Bombay, India.
- 3 Adeyeye, "Patterned Ferromagnetic and Exchange Biased Nanostructures", ICEAA '09, Special Session on New Horizons in Nano-magnetism: Experiment, Theory, Simulations and Applications, Torino, Italy, September 14-18, 2009.

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

(4) IUP-4: Nanomechanisms Ultra-Fine-Scale Structures and Living Cells

Journal Publication

- 1 B. Zhang, T.S. Lim, S.R.K Vedula, A. Li, C.T. Lim and V. Tan, "Investigation of the binding preference of Reovirus $\sigma 1$ to junctional adhesion molecule-A by classical and steered molecular dynamics", *Biochemistry*, Published 2 March 2010, Vol. 49, Iss. 8, pp. 1776-1786.
- 2 S.J. Tan, L. Yobas, G.Y.H. Lee, C.N. Ong and C.T. Lim, "Microdevice for the isolation and enumeration of cancer cells from blood", *Biomedical Microdevices*, Published August 2009, Vol. 11, No. 4, pp. 883-892.
- 3 Hou, H W, Q S Li, G Y H Lee, A P Kumar, C N Ong and C T Lim, "Deformability study of breast cancer cells using microfluidics", *Biomedical Microdevices*, Published June 2009, Vol. 11, No. 3, pp. 557-564.
- 4 C.T. Lim, A. Li and K.S.W. Tan, "Molecular mechanistic insights into the adhesion of malaria infected erythrocytes with endothelium in circulation", *Journal of Physiological Sciences*, Submitted 2009 (59, 58).

Conference Publication

- 1 A. Li, B. Russell, L. Renia, S.W. Tan and C.T. Lim, "Atomic Force Microscopy Imaging of Surface Ultrastructures of Human Malaria Infected ErythrocytesAt", ICMAT & IUMRS-ICA 2009, Singapore 2009 (Best Presentation Award).
- 2 A. Li, B. Russell, S.W. Tan and C.T. Lim, "Atomic force microscopy study of human malaria infected erythrocytes" SMART - Tohoku University Global COE Workshop on Micro & Nano Bioengineering, Singapore 2010 (Invited Talk).
- 3 A. Li, S.W. Tan and C.T. Lim, "Binding kinetics & binding sites of cytoadherent molecules on the surface of malaria infected erythrocytes", 54th Annual Meeting of the Biophysical Society, USA 2010 (International Travel Award).
- 4 Lim C.T., "Biomechanistic insights into the pathophysiology of an infectious disease", World Congress on Medical Physics & Biomedical Engineering, Munich, Germany 2009 (Invited Talk).
- 5 Lim C.T., "Experimental Techniques in Cell and Molecular Biomechanics", Biofrontiers Symposium 2009, Wakayama, Japan 2009 (Invited Talk).
- 6 Lim C.T., "Mechanical insights into the physiological functions of intercellular adhesion proteins", International Conference on Computational and Experimental Engineering & Sciences, Phuket, Thailand, 2009 (Invited Talk).
- 7 Lim C.T., "Molecular Mechanistic Insights Into The Adhesion Of Malaria Infected Erythrocytes With Endothelium In Circulation", International Union of Physiological Sciences (IUPS), 2009, Kyoto, Japan (Invited Talk).

Book Chapters

- 1 A. Li, B. Ho, J. L. Ding and C. T. Lim, "Use of atomic force microscopy as a tool to understand the action of antimicrobial peptides on bacteria", *Methods in Molecular Biology Series*, Published 2009, Springer, 2009 (Appear on the cover of the book), Invited Book Chapter.

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

(5) IUP-5: Synthesis & Stress Study of Nanocrystals Formed in a Confined Space

Journal Publication

- *1 Shih-Wei Chang, Vivian P. Chuang, Steven T Boles, Caroline A Ross, and Carl V Thompson, "Densely-packed arrays of ultrahigh-aspect-ratio silicon nanowire fabricated using block copolymer lithography and metal-assisted etching", *Advanced Functional Materials*, Published 10 August 2009, Vol. 19, Iss 15, pp. 2495-2500. ([also appeared in FRP](#))
- 2 D. Kim, A.L. Giermann, and C.V. Thompson, "Solid-state dewetting of patterned films", *Applied Physics Letters*, Published 22 Dec2009, Vol. 95, No. 25, pp. 251903.

SINGAPORE-MIT ALLIANCE SMA-2 PUBLICATIONS

CSB programme (AY 2009/2010)

Number of Research Projects with publications: 1 FRP and 4 IUPs

(* appeared in 2 or more projects)

(A) Collaborative Publications with SMA-MIT Fellows

(1) FRP: Tissue Systems Biology

Journal Publications

- *1 Zhang W, Tucker-Kellogg L, Narmada BC, Venkatraman L, Chang S, Yin L, Tan N, White JK, Jia RR, Bhowmick SS, Shen S, Dewey CF Jr & Yu H, "Cell-Delivery Therapeutics for Liver Regeneration", *Advanced Drug Delivery Reviews*, Published 15 June 2010, Vol. 62, Iss 7-8, pp. 814-826, Epub 1 March 2010 (ADDR) (IF 8.3), Elsevier Science. (*also appeared in IUP-1*)
- 2 Low, Diana H.P., Ang, Z., Yuan, Q., Frecer, V., Ho, B., Chen, J. and Ding, J. L., "A novel human tectonin protein with multivalent α -propeller folds interacts with ficolin and binds bacterial LPS", *PLoS One*, Published 16 July 2009, Vol. 4, Iss 7, pp. e6260.
- 3 Le, M, H., Xie, B. Zhou, P. Chia, P. Rizk, M. Um, G. Udolph, H. Yang, B. Lim and H. Lodish, "microRNA-125b Promotes Neuronal Differentiation in Human Cells by Repressing Multiple Targets", *Molecular Cellular Biology*, Published 27 Jul 2009, Vol. 29, Iss 19, pp. 5290 – 5305.
- 4 Low, Diana H.P., Frecer, Vladimir, Le Saux, Agnès, Anand, Ganesh Srinivasan, Ho, Bow, Chen, Jianzhu and Ding, Jeak Ling, "The molecular interfaces of GBP tectonin domains in pathogen recognition", *Journal of Biological Chemistry*, Published 29 Jan 2010, Vol. 285, pp. 9898-907.
- 5 S.L. Zhang, J. Li, G. Lykotrafitis, G. Bao & S. Suresh, "Size-Dependent Endocytosis of Nanoparticles", *Advanced Materials*, Published Jan 2009, Vol. 21, No. 4, pp. 419-424.
- *6 Tai DCS, Tan N, Xu S, Kang CH, Chia SM, Cheng CL, Wee A, Raja AM, Xiao G, Chang S, Rajapakse JC, So PTC, Tang HH, Chen CS & Yu H, "Fibro-C-Index – A comprehensive, morphology-based quantification of liver fibrosis using second harmonic generation and two-photon microscopy", *Journal of Biomedical Optics*, Published July/August 2009, Vol. 14, Iss 4, pp. 044013. (*also appeared in IUP-4*)
- 7 M. Diez-Silva, M. Dao, J.-Y. Han, C.-T. Lim & S. Suresh, "Shape and Biomechanical Characteristics of Human Red Blood Cells in Health and Disease", *MRS Bulletin*, Published May 2010, Vol. 35, No. 5, pp. 337–408.
- 8 Xie, H., Sun, L. and H.F. Lodish, "Targeting microRNAs in obesity", *Expert Opinion On Therapeutic Targets*, Published Oct 2009, Vol. 13, No. 10, pp. 1227 – 1238.
- 9 Jayapal, S., J., Lee, K. L., Ji, P., Kaldis, P., Lim, B., and H. F. Lodish, "Erythroid nuclear condensation and enucleation require histone deacetylation triggered by down-regulation of Myc and Gcn5", *Developmental Cell*, Submitted 2009.
- 10 Ramirez, T., P. Ji, S. Jayapal, H. F. Lodish and M. Murata-Hori, "Mammalian erythroblast enucleation is achieved by a novel type of cellular division", *Journal Cell Biology*, Submitted 2009.
- 11 H.W. Hou, A.A.S. Bhagat, A.G.L. Chong, P. Mao, K.S.W. Tan, J. Han & C.-T. Lim, "Deformability based cell margination – A simple microfluidic design for high throughput malaria infected erythrocyte separation", *Lab on a Chip*, Submitted May 2010.

Conference Publication

- 1 Renato Umeton, Beracah Yankama, Giuseppe Nicosia, and C. Forbes Dewey, Jr., "A Cross-Format Framework for Consistent Information Integration among Molecular Pathways and Ontologies", *Proc. 7th World Congress on Biomechanics*, In Press, Singapore, Springer-Verlag.

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SMA-2 PUBLICATIONS

- 2 R. Chandramohanadas, Y.-K. Park, L. Lui, A. Li, M. Diez-Silva, C.-T. Lim, M. Dao, M.S. Feld, P. Preiser & S. Suresh, "Biomechanistic Insights into the Escape Of Malarial Parasites From Infected Erythrocytes", 6th World Congress on Biomechanics, Singapore Suntec Convention Centre, To be presented, 1 - 6 August 2010.
- 3 G.Y Jiao, K.S.W. Tan, C.H. Sow CH, M. Dao, S. Suresh & C.T. Lim, "Computational Modeling of the Micropipette Aspiration of Malaria Infected Erythrocytes", 13th International Conference on Biomedical Engineering (ICBME), Singapore, December 3-6, 2008.
- 4 Chua HE, Bhowmick SS, Forbes CD, Yu H & Tucker-Kellogg L, "In Silico Approach for Identifying Sensitive Nodes in Biological Network", RECOMB 2010 Fourteenth International Conference on Research in Computational Molecular Biology, 04-10.
- *5 Chua HE, Bhowmick SS, Yu H & Forbes Jr.CF, "In silico approach to identify sensitive molecules for Use as potential drug targets", BMES 2009 Annual Fall Scientific Meeting (In Biomedical Engineering Society Annual Fall Meeting), Oct 2009, Pittsburgh, Poster. ([also appeared in IUP-1](#))
- 6 Yu H, So P, Tai D, He Y, Xu S, Peng Q, Yew E & Sheppard C, "Liver fibrosis research with non-linear optics", Focus on Microscopy Conference, 03-10.
- 7 Abdul Rahim NA, Lliescu C, Kamm R & Yu H, "Microfluidic device captures correlation between human mesenchymal stem cell differentiation capacity and migration activity", 2009 World Stem Cell Summit, 09-09.
- 8 Renato Umeton, Beracah Yankama, Giuseppe Nicosia, and C. Forbes Dewey, Jr., "OREMP: Ontology Reasoning Engine for Molecular Pathways", Proc. ORES 1st International Workshop on Ontology Repositories and Editors for the Semantic Web, In Press, Springer-Verlag.
- 9 P.A. Carvalho, R. Zhang, M. Diez.-Silva, C.T. Lim & S. Suresh, "Quantitative cytoadherence of diseased cells: Probing placental receptors with malaria-infected red blood cells", 6th World Congress on Biomechanics, Singapore Suntec Convention Centre, To be presented, 1 - 6 August 2010.
- *10 Venkatraman L, Yu H, Bhowmick SS, Forbes DJr & Tucker-Kellogg L, "The steady states and dynamics of urokinase mediated plasmin activation", Pacific Symposium on Biocomputing 2010, 01-10, pp. 190-200. ([also appeared in IUP-3](#))
- 11 Menjoge R. S. & Welsch, R.E., "Visualizing the Sampling Variability of Plots", Proceedings of COMPSTAT 2010, Accepted, Paris, August 2010.

(2) IUP-1: Advanced Imaging Informatics Technologies (AIIT)

Journal Publications

- *1 Zhang W, Tucker-Kellogg L, Narmada BC, Venkatraman L, Chang S, Yin L, Tan N, White JK, Jia RR, Bhowmick SS, Shen S, Dewey CF Jr & Yu H, "Cell-Delivery Therapeutics for Liver Regeneration", *Advanced Drug Delivery Reviews*, Published 15 June 2010, Vol. 62, Iss 7-8, pp. 814-826, Epub 1 March 2010 (ADDR) (IF 8.3), Elsevier Science. ([also appeared in FRP](#))
- 2 Y. Shi, S.M. Varghese, S.Huang, J.White, S. Pervaiz and L. Tucker-Kellogg, "Computational Modeling of Pathway Dynamics for Detecting Drug Effects: Paradoxical Effects of LY303511 on TRAIL-Induced Apoptosis", *Proceedings of Computational Systems Bioinformatics*, Published August 2009, Vol. 8, pp. 213-225.

Conference Publication

- *1 Chua HE, Bhowmick SS, Yu H & Forbes Jr.CF, "In silico approach to identify sensitive molecules for Use as potential drug targets", BMES 2009 Annual Fall Scientific Meeting (In Biomedical Engineering Society Annual Fall Meeting), Oct 2009, Pittsburgh, Poster. ([also appeared in FRP](#))

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

(3) IUP-2: Advanced Microscopy for Bioinformatics

Journal Publications

- 1 Tang, W. T., Chung, E., Kim, Y., Sheppard, C. J. R. & So, P. T. C., "Surface plasmon-coupled emission microscopy with a spiral phase plate", *Optics Letters*, Published 9 Feb 2010, Vol. 35, Iss 4, pp. 517-519.
- 2 Chia, S.M., Tan, N., Venkatraman, L., Chang, S., Tucker-Kellogg, L., Kuan, F.Y., Balakrishnan Chakrapani, N., Wang, J.J., So, P., Bhowmick, S.S., Dewey Jr., F.C., White, J.K., Shen, S., and Yu, H., "Thrombospondin-1 and Plasmin Interplay in TGF- β 1 Activation for Regulation of Liver Fibrosis and Regression", *Proceedings of the National Academy of Science (PNAS)*, Submitted Sep 2009.

Conference Publication

- 1 Kim, Y-H, Chung, E., Tang, W. T., Wang, X., Erramilli, S., Sheppard, C. J. R., and So, P. T. C., "Sub-diffraction limited wide field imaging and microfabrication based on surface plasmons", *Biophys Society Annual Meeting*, February 2010, San Francisco, CA.

(4) IUP-3: Techniques for, and Applications of, Mass-Action Kinetics Models

Conference Publication

- 1 Yuan Shi, Simi M. Varghese, Sinong Huang, Jacob White, Shazib Pervaiz & Lisa Tucker-Kellogg, "Computational Modeling of Pathway Dynamics for Detecting Drug Effects: Paradoxical Effects of LY303511 on Trail-Induced Apoptosis", *Proceedings of 8th International Conference on Computational Systems Bioinformatics (CSB2009)*, Stanford University, 10-12 August 2009.
- 2 T. H. Nim, J. White and L. Tucker-Kellogg, "Fast and Deterministic Parameter Estimation of Biological Pathway using Belief Propagation", *18th Annual Growth Factor and Signal Transduction Symposium, Systems Biology: Integrative, Comparative and Multiscale Modeling*, June 2009, Ames, Iowa.
- *3 Venkatraman L, Yu H, Bhowmick SS, Forbes DJr & Tucker-Kellogg L, "The steady states and dynamics of urokinase mediated plasmin activation", *Pacific Symposium on Biocomputing 2010*, 01-10, pp. 190-200. ([also appeared in FRP](#))

(5) IUP-4: Advanced Computational Image Analysis

Journal Publications

- 1 M. Veronika, J. Evans, P. Matsudaira, R. Welsch, and J. C. Rajapakse, "Subpopulation analysis based on temporal features of high content images", *BMC Bioinformatics*, Published 3 Dec 2009, Vol. 10, suppl 15, pp. S4.
- *2 Tai DCS, Tan N, Xu S, Kang CH, Chia SM, Cheng CL, Wee A, Raja AM, Xiao G, Chang S, Rajapakse JC, So PTC, Tang HH, Chen CS & Yu H, "Fibro-C-Index – A comprehensive, morphology-based quantification of liver fibrosis using second harmonic generation and two-photon microscopy", *Journal of Biomedical Optics*, Published July/August 2009, Vol. 14, Iss 4, pp. 044013. ([also appeared in FRP](#))

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

CSB programme (AY 2009/2010)

(B) Non-collaborative publications

(1) FRP: Tissue Systems Biology

Journal Publications

- 1 Ni M, Wang Zhengyuan, Tong WH, Choudhury D, Abdul Rahim NA, Ilescu C & Yu H, "Cell Culture on MEMS Platforms: A Review", International Journal of Molecular Sciences, Published 18 Dec 2009, Vol. 10, Iss 12, pp. 5411-5441, special issues on "Biocompatibility of Materials".
- 2 H. Yao, M. Dao, T. Imholt, J. Huang, K. Wheeler, S. Suresh & C. Ortiz, "Protection mechanisms of the iron-plated armor of a deep-sea hydrothermal vent gastropod", Proceedings of the National Academy of Science (PNAS), Published 19 Jan 2010, Vol. 107, No. 3, pp. 987-992.
- 3 Wang Zhengyuan, Lam Siew Hong, S. Mathavan, Gong Zhiyuan & Matsudaira Paul, "Morphological and molecular evidence for functional organization along the rostrocaudal axis of the adult zebrafish intestine", BMC Genomics, Published 22 June 2010, Vol. 11, Article 392.
- 4 S.Y. Wong, K.-H. Chiam, C.-T. Lim & P. Matsudaira, "Computational Model of Cell Positioning, Directed and Collective Migration in the Intestinal Crypt Epithelium", Journal of the Royal Society – Interface, Published 6 June 2010, Vol. 7, No. S3, pp. S351-S363.
- 5 Zhang C, Chia SM, Ong SM, Zhang S, Toh YC, van Noort D & Yu H, "The Controlled Presentation of TGF- β 1 to Hepatocytes in a 3D-Microfluidic Cell Culture System", Biomaterials, Published August 2009, Vol. 30, Iss 23-24, pp. 3847-3853.
- 6 Ong SM, Zhao Z, Arooz T, Zhao D, Zhang S, Du T, Wasser M, van Noort D & Yu H, "Engineering a scaffold-free 3D tumor model for in vitro drug penetration studies", Biomaterials, Published Feb 2010, Vol. 31, Iss 6, pp. 1180-1190.
- 7 Toh YC, Lim TC, Tai D, Xiao G, van Noort D & Yu H, "A microfluidic 3D hepatocyte chip for drug toxicity testing", Lab on a Chip, Published July 2009, Vol. 9, Iss 14, pp. 2026-2035.
- 8 Xia L, Ng S, Han R, Tuo X, Xiao G, Leo HL, Cheng T & Yu H, "Laminar-flow immediate-overlay hepatocyte sandwich perfusion system for drug hepatotoxicity testing", Biomaterials, Published Oct 2009, Vol. 30, Iss 30, pp. 5927-5936.
- *9 Zhang C, Zhao Z, Abdul Rahim NA, van Noort D & Yu H, "Towards a Human-on-Chip: Culturing Multiple Cell Types on a Chip with Compartmentalized Microenvironments", Lab on a Chip, Published Oct 2009, Vol. 9, Iss 22, pp. 3185-3192. (*also appeared in IUP-2*)
- 10 Magalhaes R, Anil Kumar Pr, Wen F, Zhao X, Yu H & Kuleshova LL, "The use of vitrification to preserve primary rat hepatocyte monolayer on collagen-coated poly(ethylene-terephthalate) surfaces for a hybrid liver support device", Biomaterials, Published Sep 2009, Vol. 30, Iss 25, pp. 4136-4142.
- *11 Mondal P. P., Gilbert, R. J., and So, P.T.C., "Photobleaching Reduced Fluorescence Correlation Spectroscopy", Applied Physics Letters & Physical Review Letters, Submitted 2009. (*also appeared in IUP-2*)
- *12 Cha J.W., Ballesta, J. & So, P. T. C., "A Shack-Hartmann Wavefront Sensor Based Adaptive Optics System for Multiphoton Microscopy", Journal of Biomedical Optics & Optics Express, Submitted 2009. (*also appeared in IUP-2*)
- *13 Kim D., Lee, H., Shin, Y., Chen, Y., and So, P.T.C., "High-Throughput High-Sensitivity Wide-Field Multiphoton Microscopy", Optics Express, Submitted 2009. (*also appeared in IUP-2*)
- 14 Du Jianguo, Gong Zhiyuan & Matsudaira Paul, "STORM: A General Model to Determine the Number and Adaptive Changes of Epithelial Stem Cells in the Intestinal Tracts", PLOS One, Submitted 2009.

SINGAPORE-MIT ALLIANCE SMA-2 PUBLICATIONS

- 15 A. Li, B. Russell, L. Renia, U. Lek-Uthai, F. Nosten & C.-T. Lim, "High density of 'spiky' excrescences covering the surface of an erythrocyte infected with Plasmodium malaria", British Journal of Haematology, Submitted May 2010.

Conference Publication

- 1 Nugraha B, Yue Z & Yu H, "3D Cellulosic Gel for Hepatotoxicity Screening", 31st Annual Meeting of Japanese Society for Biomaterials, 11-09.
- 2 S. Suresh & M. Dao, "Cell Mechanobiology and Human Disease Pathology – Human Red Blood Cell and Malaria", 2010 MRS Spring Meeting, San Francisco, California, USA, April 5-9, 2010.
- 3 S. Suresh, "Computational Mechanics of Biological Cells and Human Disease States", 10th US National Congress on Computational Mechanics (USNCCM X), Columbus, Ohio, USA, July 2009.
- 4 M. Dao & S. Suresh, "Computational modeling and experimental investigation of biological cells and soft tissues", 10th US National Congress on Computational Mechanics (USNCCM X), Columbus, Ohio, USA, July 16-19, 2009.
- 5 Choudhury D, Zhang C, van Noort D & Yu H, "Development of a predictive physiologically based pharmacokinetic (PBPK) microfluidics chip", International Symposium on Microchemistry and Microsystems (ISMM) 2010, 05-10.
- 6 Dan YY, Amer L, Zhang SF, Yu H, Wong PC & Lim SG, "Fetal Liver Progenitor Niche", The 60th Annual Meeting of the American Association for the Study of Liver Diseases 2009, 11-09.
- 7 Tai D, Tan N, Kang CH, Cheng CL, Chia SM, Xiao GF, Sun WX, Wee A & Yu H, "Fibro-C-Index – A standardized quantification of liver fibrosis using second harmonic generation and two-photon microscopy", The Liver Meeting, 11-09.
- 8 Choudhury D, Van Noort D & Yu H, "Fish on a chip: A microfluidic platform for in vitro drug studies in developing fish embryo", International Symposium on Microchemistry and Microsystems (ISMM) 2010, 05-10.
- 9 Lodish H. J, Flygare, and S. Chou, "From stem cell to erythroblast: Regulation of red cell production at multiple levels by multiple hormones", IUBMB Life, In Press.
- 10 Van Noort D & Yu H, "In vivo drug testing in microfluidics on Medaka fish embryo", uTAS 2009, 11-09.
- 11 S. Suresh, "Lecture for SATYA N ATLURI MEDAL", 2009 International Conference on Computational and Experimental Engineering and Sciences (ICCES'09), Phuket, Thailand, April 2009
- 12 Mo X, Nugraha B, Zhang C, Toh YC, Tan CH, Wang Y & Yu H, "Micro-fabrication Factory of Complex Tissues", 3rd East-Asian Pacific Student Workshop on Nano-Biomedical Engineering, 12-09.
- 13 M. Diez-Silva, D.J. Quinn, I.V. Pivkin & M. Dao, "Molecular-Level Biophysical Properties of Human Red Blood Cells and Connections to Pathological States", GEM4/SMART Symposium on Infections Diseases, 5th International Conference on Materials for Advanced Technologies (ICMAT 2009), Singapore, June 29 – July 3, 2009.
- 14 Nugraha B, Yue Z & Yu H, "Novel Cellulosic Hydrogel Scaffold for Liver Tissue Engineering", 2nd NGS Student Symposium, 02-10 & 3rd East Asian Pacific Student Workshop on Nano-biomedical Engineering, 12-09.
- 15 I.V. Pivkin, M. Dao, G.E. Karniadakis & S. Suresh, "Numerical simulations of flow dynamics of human red blood cells in microfluidic systems", IV European Congress on Computational Mechanics

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

(ECCM IV): Solids, Structures and Coupled Problems in Engineering, Palais des Congrès, Paris, France, May 16-21, 2010.

- 16 Alvin G.L. Chong & Kevin S.W. Tan, "The Effect of Biomechanical Stress on the Biology of the Malaria Parasite *Plasmodium falciparum*", GEM4/SMART Symposium on Infections Diseases, 5th International Conference on Materials for Advanced Technologies (ICMAT 2009), Singapore, June 29 – July 3, 2009.
- 17 Ng IC, Teo LY, Lee SY & Yu H, "Upregulation of 160-kDa kinectin during epithelial-mesenchymal transition promotes cell migration and invasion", 2nd NGS Student Symposium, 02-10.
- 18 M. Dao & S. Suresh, "Viscoelastic and Rheological Properties of Human Red Blood Cells", 2009 International Conference on Computational and Experimental Engineering and Sciences (ICCES'09), Phuket, Thailand, April 8, 2009.
- 19 M. Dao, D.J. Quinn, I.V. Pivkin, A.K. Yip, K.H. Chiam & S. Suresh, "Viscoelastic Properties of Healthy and *P. Falciparum* Infected Human Red Blood Cells", 2008 MRS Fall Meeting, Boston, Dec. 1-5, 2008.

(2) IUP-1: Advanced Imaging Informatics Technologies (AIIT)

Conference Publication

- 1 Yang Song & Sourav S Bhowmick, "BIDEL: An XML-based System for Effective Fast Change Detection of Genomic and Proteomic Data", In Proceedings of 15th International Conference on Database Systems for Advanced Applications (DASFAA 2010), April 2010, Springer Verlag, Tsukuba, Japan.
- 2 C. Forbes Dewey, Jr., Masataka Imura, Sukhyun Song, Lindsey mcQuade, Stephen Lippard, and Guillermo Garcia-Cardena, "Determining the rate of NO production by endothelial cells using computational fluid dynamics and molecular fluorescence", In Biomedical Engineering Society Annual Fall Meeting, Oct 2009, Pittsburgh, invited oral presentation.

(3) IUP-2: Advanced Microscopy for Bioinformatics

Journal Publications

- 1 Sheppard, C.J.R , Rehman, S. , Balla, N.K., Yew, E.Y.S. & Tang, W.T., "Bessel beams: Effects of polarization", Optics Communications, Published 15 Dec 2009, Vol. 282, Iss 24, pp. 4647—4656.
- 2 W.T. Tang, E.Y.S. Yew, and Colin J.R. Sheppard, "Polarization conversion in confocal microscopy with radially polarized illumination", Optics Letters, Published 9 Jul 2009, Vol. 34, Iss 14, pp. 2147-2149.
- *3 Zhang C, Zhao Z, Abdul Rahim NA, van Noort D & Yu H, "Towards a Human-on-Chip: Culturing Multiple Cell Types on a Chip with Compartmentalized Microenvironments", Lab on a Chip, Published Oct 2009, Vol. 9, Iss 22, pp. 3185-3192. (*also appeared in FRP*)
- *4 Mondal P. P., Gilbert, R. J., and So, P.T.C., "Photobleaching Reduced Fluorescence Correlation Spectroscopy", Applied Physics Letters & Physical Review Letters, Submitted 2009. (*also appeared in FRP*)
- 5 Raja, A.M., Tai, D.C.S., Xu, S., Sun, W., Zhou, J., Chen, C.S., and Yu, H., "Pulse Modulated Second Harmonic Imaging Microscope (PM-SHIM) imaging quantitatively demonstrates marked increase of collagen in tumor stroma after chemotherapy", Journal of Biomedical Optics, Submitted 2009.
- *6 Cha J.W., Ballesta, J. & So, P. T. C., "A Shack-Hartmann Wavefront Sensor Based Adaptive Optics System for Multiphoton Microscopy", Journal of Biomedical Optics & Optics Express, Submitted 2009. (*also appeared in FRP*)

SINGAPORE-MIT ALLIANCE SMA-2 PUBLICATIONS

- *7 Kim D., Lee, H., Shin, Y., Chen, Y., and So, P.T.C., "High-Throughput High-Sensitivity Wide-Field Multiphoton Microscopy", *Optics Express*, Submitted 2009. (*also appeared in FRP*)
- 8 Kim, D. and So, P. T. C., "Three-dimensional (3D) high-speed imaging and fabrication system based on ultrafast optical pulse manipulation", *Proceedings of SPIE 7183*, Submitted 2009. (Multiphoton Microscopy in the Biomedical Sciences IX)
- 9 Kim, D. and So, P. T. C., "High-throughput three-dimensional (3D) lithographic microfabrication in biomedical applications", *Proceedings of SPIE 7569*, Submitted 26 Feb 2010. (Multiphoton Microscopy in the Biomedical Sciences X)
- 10 Chen, W. L., Li, T. H., Su, P. J., Chou, C. K., Fwu, P. T., Lin, S. J., Kim, D., So, P. T. C., and Dong, C. Y., "Second-order susceptibility imaging with polarization-resolved second harmonic generation microscopy", *Proceedings of SPIE 7569*, Submitted 26 Feb 2010. (Multiphoton Microscopy in the Biomedical Sciences X)

Conference Publication

- 1 P. T. C. So, "Frontiers in Optical Microscopy", NSF Center for Biophotonics Annual Retreat, July 2009, UC Davis, Lake Tahoe, CA.
- 2 Kim, Y-H, Kim, D., Erramilli, S., and So, P. T. C., "High resolution wide field stimulated raman scattering microscopy", International Conference on Robust Statistics (ICORS 2010), February 2010, San Francisco, CA.
- 3 P. T. C. So, "High Throughput, High Content 3D Tissue Image Cytometry", Pittcon 2010, March 2010, Orland, FL.
- 4 P. T. C. So, "High Throughput, High Content Tissue Cytometry", 31st International Conference of the IEEE Engineering in Medicine and Biology Society, September 2009, Minneapolis, MN.
- 5 P. T. C. So, "Microscopic Imaging, Spectroscopy and Microfabrication Based on Depth Resolved Wide Field Imaging (DRWFI)", Advanced Imaging Methods Workshop 2010, January 2010, Berkeley, CA.
- 6 P. T. C. So, "Super-Resolution Imaging based on Standing-Wave TIR and SPR Microscopy", American Chemical Society Fall 2009 Annual Meeting, August 2009, Washington, DC.
- 7 W. T. Tang, P. T. C. So & C. J. R. Sheppard, "Surface Plasmon Coupled Emission Microscopy and its Vectorial Optical Transfer Function", The 4th Asian and Pacific Rim Symposium on Biophotonics, May 2009, Jeju island, Korea.
- 8 P. T. C. So, "Two-Photon High Throughput, High Content Tissue Cytometry", CLEO/QELS OSA Conference, June 2009, Baltimore, MD.
- 9 P. T. C. So, "Wide Field Two-Photon Imaging and Microfabrication", 4th Workshop on Advanced Multiphoton and Fluorescence Lifetime Imaging Techniques, June 2009, Saarland University, Saarbrücken, Germany.

(4) IUP-4: Advanced Computational Image Analysis

Journal Publications

- 1 I. Chaturvedi and J. C. Rajapakse, "Detecting robust time-delayed regulation in *Mycobacterium tuberculosis*", *BMC Genomics*, Published 3 Dec 2009, Vol. 10, suppl 3, pp. S28.
- 2 P. Mundra and J. C. Rajapakse, "Gene and Sample Selection for Cancer Classification with Support Vectors based t-statistic", *Neurocomputing*, Submitted 10 May 2010, Available on-line.

SINGAPORE-MIT ALLIANCE SMA-2 PUBLICATIONS

- 3 R .S. Menjoge and R .E. Welsch, "A Diagnostic Model for Simultaneous Feature Selection and Outlier Identification in Linear Regression", Computational Statistics and Data Analysis, Submitted 20 Feb 2010.
- 4 M. N. Nguyen, J. M. Zurada, and J. C. Rajapakse, "Towards better understanding of protein secondary structure: extracting prediction rules", IEEE Transactions on Computational Biology and Bioinformatics, Submitted 2009, Available on-line.
- 5 T. D. Nguyen and R. E. Welsch, "Robust Regression Using Semi-Definite Programming", Computational Statistics and Data Analysis, Submitted 2010.
- 6 I. Chaturvedi and J. C. Rajapakse, "Building Gene Networks with Time-Delayed Regulations", Pattern Recognition Letters, Submitted 6 Mar 2010, Available on-line.

Conference Publication

- 1 R. S. Menjoge and R.E. Welsch, "Outlier Detection for Covariance Estimation via Feature Selection Algorithms", Proceedings of the International Statistical Institute 57th Session, Durban, South Africa.
- 2 P. Mundra and J. C. Rajapakse, "Support Vectors based Correlation Coefficient for Gene and Sample Selection in Cancer Classification", 2010 IEEE Symposium on Computational Intelligence in Computational Biology and Bioinformatics (CIBCB 2010), May 2010, Best Student Paper Award.

Book Chapters

- 1 J. Cheng, E. G. L. Koh, S. Ahmed, and J. C. Rajapakse, "Joint tracking of cell morphology and motion", Pattern Recognition in Bioinformatics (PRIB), Published 2009, 5780 LNBI, pp. 36-45, Proceedings, Lecture Notes in Bioinformatics.
- 2 M. N. Nguyen, J. Ma, G. B. Fogel, and J. C. Rajapakse, "Di-codon usage for gene classification", Pattern Recognition in Bioinformatics (PRIB), Published 2009, 5780 LNBI, pp. 211-221, Proceedings, Lecture Notes in Bioinformatics, Lecture Notes in Bioinformatics.

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

CE programme (AY 2009/2010)

Number of Research Projects with publications: 1 FRP and 3 IUPs

(* appeared in 2 or more projects)

(A) Collaborative Publications with SMA-MIT Fellows

(1) FRP: Design-Simulate-Fabricate Micro-/Nano-fluidics for Cell and Biomolecule Manipulation

Journal Publications

- 1 H.-H. Cui, J. Voldman, X.-F. He, and K.-M. Lim, "Separation of particles by pulsed dielectrophoresis", Lab on a Chip, Published 21 Aug 2009, Vol. 9, Iss 16, pp. 2306-2312.
- *2 Zi Rui Li, G. R. Liu, J. Han, Y. Cheng, Y. Z. Chen, J.-S. Wang & N. G. Hadjiconstantinou, "Analytical description of Ogston-regime biomolecule separation using nanofilters and nanopores", Physical Review E, Published 8 Oct 2009, Vol. 80, Iss 4, pp. 041911-1 – 11. (*also appeared in IUP-1*)
- *3 Le D.V., White J., Peraire J., Lim K.M. and Khoo B.C., "An implicit immersed boundary method for three-dimensional fluid-membrane interactions", Journal of Computational Physics, Published 1 Dec 2009, Vol. 228, Iss 22, pp 8427—8445. (*also appeared in IUP-1*)
- *4 Nguyen, V.-T., Peraire, J., Khoo, B.C., Persson, P.-O., "A discontinuous galerkin front tracking method for two-phase flows with surface tension", Computers & Fluids, Published January 2010, Vol. 39, Iss 1, pp. 1-14. (*also appeared in IUP-1*)

(2) IUP-1: Effective Computation: Reduced Order Models and Uncertainty Management in Numerical Simulations

Journal Publications

- *1 Zi Rui Li, G. R. Liu, J. Han, Y. Cheng, Y. Z. Chen, J.-S. Wang & N. G. Hadjiconstantinou, "Analytical description of Ogston-regime biomolecule separation using nanofilters and nanopores", Physical Review E, Published 8 Oct 2009, Vol. 80, Iss 4, pp. 041911-1 – 11. (*also appeared in FRP*)
- *2 Le D.V., White J., Peraire J., Lim K.M. and Khoo B.C., "An implicit immersed boundary method for three-dimensional fluid-membrane interactions", Journal of Computational Physics, Published 1 Dec 2009, Vol. 228, Iss 22, pp 8427—8445. (*also appeared in FRP*)
- *3 Nguyen, V.-T., Peraire, J., Khoo, B.C., Persson, P.-O., "A discontinuous galerkin front tracking method for two-phase flows with surface tension", Computers & Fluids, Published January 2010, Vol. 39, Iss 1, pp. 1-14. (*also appeared in FRP*)

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

CE programme (AY 2009/2010)

(B) Non-collaborative Publications

(1) FRP: Design-Simulate-Fabricate Micro-/Nano-fluidics for Cell and Biomolecule Manipulation

Journal Publications

- 1 Yamada, M., P. Mao, J. Fu & J. Han, "Rapid quantification of disease-marker proteins using continuous-flow immunoseparation in a nano-sieve fluidic device", *Analytical Chemistry*, Published 15 Aug 2009, Vol. 81, Iss 16, pp. 7067-7074.
- 2 P.G. Jayathilake, Z.-J. Tan, B.C. Khoo and N.E. Wijeyesundera, "Deformation and Osmotic Swelling of an Elastic Membrane capsule in Stokes Flows by the Immersed Interface Method", *Chemical Engineering Science*, Published 1 Feb 2010, Vol. 65, Iss 3, pp. 1237-1252.
- 3 P.G. Jayathilake, B.C. Khoo and Z.-J. Tan, "Effect of membrane permeability on capsule substrate adhesion: Computation using immersed interface method", *Chemical Engineering Science*, Published 1 June 2010, Vol. 65, Iss 11, pp. 3567-3578.
- 4 Wang S.Y., Chen P.Q., Lim K.M., and Khoo B.C., "A BEM/FEM coupling approach for fluid-structure interaction simulation of cell motion", *Communications in Computational Physics*, Published 6 Jan 2010, Vol. 7, Iss 5, pp. 994-1026.
- 5 Z.-J. Tan, K.M. Lim and B.C. Khoo, "A Fast Immersed Interface Method for Solving Stokes Flows on Irregular Domains", *Computers & Fluids*, Published Dec 2009, Vol. 38, Iss 10, pp. 1973-1983.
- *6 Galbally, D, Fidkowski, K., Willcox, K. and Ghattas, O, "Nonlinear Model Reduction for Uncertainty Quantification in Large-Scale Inverse Problems", *International Journal for Numerical Methods in Engineering*, Published 19 March 2010, Vol. 81, Iss. 12, pp. 1581-1608. (*also appeared in IUP-1*)
- 7 Z.-J. Tan, Lim K.M. and Khoo B.C., "A Level Set-based Immersed Interface Method for Solving Incompressible Viscous Flows with the Prescribed Velocity at the Boundary", *International Journal for Numerical Methods in Fluids*, Published 30 Jan 2010, Vol. 62, Iss 3, pp. 267--290.
- 8 J. P. Bardhan, M. D. Altman, B. Tidor & J. K. White, "Reverse-Schur Approach to Optimization with Linear PDE Constraints: Application to Biomolecule Analysis and Design", *Journal of Chemical Theory and Computation*, Published 8 Dec 2009, Vol. 5, No. 12, pp. 3260-3278.
- 9 Z.-J. Tan, K.M. Lim and B.C. Khoo, "An Immersed Interface Method for Stokes Flows with Fixed/Moving Interfaces and Static Rigid Boundaries", *Journal of Computational Physics*, Published 1 Oct 2009, Vol. 228, Iss 18, pp. 6855-6881.
- *10 N.C. Nguyen, J. Peraire & B. Cockburn, "An implicit high-order hybridizable discontinuous Galerkin method for nonlinear convection–diffusion equations", *Journal of Computational Physics*, Published 10 Dec 2009, Vol. 228, Iss 23, pp. 8841–8855. (*also appeared in IUP-1*)
- 11 S. P. Desai, D. M. Freeman, and J. Voldman, "Plastic masters - rigid templates for soft lithography", *Lab on a Chip*, Published 5 March 2009, Vol 9, Iss 11, pp. 1631-1637.
- 12 G. N. Fayad & N. G. Hadjiconstantinou, "Realistic Brownian Dynamics Simulations of Biological Molecule Separation In Nanofluidic Devices", *Microfluidics and Nanofluidics*, Published April 2010, Vol. 8, No. 4, pp. 521-529.
- 13 Jianping Fu, Pan Mao & Jongyoon Han, "Continuous-Flow Bioseparation Using Microfabricated Anisotropic Nanofluidic Sieving Structures", *Nature Protocols*, Published 29 Oct 2009, Vol. 4, No. 11, pp. 1681-1698.
- 14 MTH Reid, AW Rodriguez, J White & SG Johnson, "Efficient computation of Casimir interactions between arbitrary 3D objects", *Physical Review Letters*, Published 24 July 2009, Vol. 103, Iss 4, pp. 040401.

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

- 15 N. G. Hadjiconstantinou, G. A. Radtke and L.L. Baker, "On variance-reduced simulations of the Boltzmann transport equation for small-scale heat transfer applications", *Journal of Heat Transfer*, Submitted.
- 16 H. A. Al-Mohssen & N. G. Hadjiconstantinou, "Low-variance direct Monte Carlo Simulations using Importance Weights", *Mathematical Modeling and Numerical Analysis*, Submitted.

Conference Publications

- 1 G. N. Fayad & N. G. Hadjiconstantinou, "A Brownian Dynamics Model of Worm-like Biomolecule Separation Using Periodic Nanofilter Arrays", *Proceedings of the ASME International Mechanical Engineering Congress and Exposition*, 2009.
- 2 Peraire, J, Nguyen, N.C. & Cockburn, B, "A hybridizable discontinuous Galerkin method for the compressible Euler and Navier-Stokes equations", 48th AIAA Conference, AIAA2010-363, Jan 2010, Orlando, FL.
- 3 Nguyen, N.C, Peraire, J. & Cockburn, B, "A hybridizable discontinuous Galerkin method for the incompressible Navier-Stokes equations", 48th AIAA Conference, AIAA2010-362, Jan 2010, Orlando, FL.
- 4 Yamada, M., P. Mao, J. & Fu, J. Han, "Continuous-flow immunoseparation and rapid quantification of protein binding kinetics in anisotropically patterned nano-sieve structures", *MicroTAS 2009*, 2009, Jeju Island, Korea.
- *5 M. Buffoni & K. Willcox, "Model Reduction Approaches for Reacting Flow Applications", *AIAA 40th Fluid Dynamics Conference And Exhibit*, Chicago, IL, June 2010, Chicago, IL. (*also appeared in IUP-1*)
- 6 N. G. Hadjiconstantinou, G. A. Radtke and L. L. Baker, "On efficient particle methods for solving the Boltzmann Transport Equation in the Relaxation-time approximation", *Proceedings of the ASME International Mechanical Engineering Congress and Exposition*, 2009.
- 7 S. P. Desai, D. M. Freeman, and J. Voldman, "Plastic masters - rigid templates for soft lithography", *MicroTAS 2009*, 2009, Jeju Island, Korea.

(2) IUP-1: Effective Computation: Reduced Order Models and Uncertainty Management in Numerical Simulations

Journal Publications

- 1 G.R. Liu, T. Nguyen-Thoi & K.Y. Lam, "A novel FEM by scaling the gradient of strains with factor alpha (alpha FEM)", *Computational Mechanics*, Published Feb 2009, Vol. 43, No. 3, pp. 369-391.
- 2 X. Zhao, G.R. Liu, K.Y. Dai, Z.H. Zhong, G.Y. Li & X. Han, "A linearly conforming radial point interpolation method (LC-RPIM) for shells", *Computational Mechanics*, Published Feb 2009, Vol. 43, No. 3, pp. 403-413.
- 3 T. Nguyen-Thoi, G.R. Liu, H.C. Vu-Do & H. Nguyen-Xuan, "An edge-based smoothed finite element method for visco-elastoplastic analyses of 2D solids using triangular mesh", *Computational Mechanics*, Published Dec 2009, Vol. 45, No. 1, pp. 23-44.
- 4 X. Xu, G.R. Liu & G.Y. Zhang, "A point interpolation method with least square strain field (PIM-LSS) for solution bounds and ultra-accurate solutions using triangular mesh", *Computer Methods in Applied Mechanics & Engineering*, Published 15 Apr 2009, Vol. 198, Iss 17-20, pp. 1486-1499.
- 5 Z.C. He, G.R. Liu, Z.H. Zhong, S.C. Wu, G.Y. Zhang & A.G. Cheng, "An edge-based smoothed finite element method (ES-FEM) for analyzing three-dimensional acoustic problems", *Computer Methods in Applied Mechanics & Engineering*, Published 1 Dec 2009, Vol. 199, Iss 1-4, pp. 20-33.

SINGAPORE-MIT ALLIANCE SMA-2 PUBLICATIONS

- 6 G.R. Liu, T. Nguyen-Thoi, H. Nguyen-Xuan & K.Y. Lam, "A node-based smoothed finite element method (NS-FEM) for upper bound solutions to solid mechanics problems", *Computers & Structures*, Published January 2009, Vol. 87, Iss 1-2, pp. 14-26.
- *7 Galbally, D, Fidkowski, K., Willcox, K. and Ghattas, O, "Nonlinear Model Reduction for Uncertainty Quantification in Large-Scale Inverse Problems", *International Journal for Numerical Methods in Engineering*, Published 19 March 2010, Vol. 81, Iss. 12, pp. 1581-1608. (*also appeared in FRP*)
- 8 G.R. Liu, T. Nguyen-Thoi, H. Nguyen-Xuan, K.Y. Dai & K.Y. Lam, "On the essence and the evaluation of the shape functions for the smoothed finite element method (SFEM)", *International Journal for Numerical Methods in Engineering*, Published 26 Mar 2009, Vol. 77, Iss 13, pp. 1863-1869.
- 9 G.R. Liu, X. Xu, G.Y. Zhang & T. Nguyen-Thoi, "A superconvergent point interpolation method (SC-PIM) with piecewise linear strain field using triangular mesh", *International Journal for Numerical Methods in Engineering*, Published 5 March 2009, Vol. 77, Iss 10, pp. 1439-1467.
- 10 T. Nguyen-Thoi, G.R. Liu, K.Y. Lam & G.Y. Zhang, "A face-based smoothed finite element method (FS-FEM) for 3D linear and geometrically non-linear solid mechanics problems using 4-node tetrahedral elements", *International Journal for Numerical Methods in Engineering*, Published 16 April 2009, Vol. 78, Iss 3, pp. 324-353.
- 11 T. Nguyen-Thoi, G.R. Liu & H. Nguyen-Xuan, "Additional properties of the node-based smoothed finite element method (NS-FEM) for solid mechanics problems", *International Journal of Computation Methods*, Published Dec 2009, Vol. 6, Iss 4, pp. 633-666.
- 12 G.R. Liu, "On G space theory", *International Journal of Computation Methods*, Published June 2009, Vol. 6, Iss 2, pp. 257-289.
- 13 X.Y. Cui, G.R. Liu, G.Y. Li, G.Y. Zhang & G.Y. Sun, "Analysis of elastic-plastic problems using edge-based smoothed finite element method", *International Journal of Pressure Vessels and Piping*, Published Oct 2009, Vol. 86, Iss 10, pp. 711-718.
- 14 S.C. Wu, G.R. Liu, H.O. Zhang, X. Xu & Z.R. Li, "A node-based smoothed point interpolation method (NS-PIM) for three-dimensional heat transfer problems", *International Journal of Thermal Sciences*, Published July 2009, Vol. 48, Iss 7, pp. 1367-1376.
- 15 K. Zaw, G.R. Liu, B. Deng & K.B.C. Tan, "Rapid identification of elastic modulus of the interface tissue on dental implants surfaces using reduced-basis method and a neural network", *Journal of Biomechanics*, Published 26 Mar 2009, Vol. 42, Iss 5, pp. 634-641.
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- 17 G.R. Liu, H. Nguyen-Xuan, T. Nguyen-Thoi & X. Xu, "A novel Galerkin-like weakform and a super convergent alpha finite element method (S alpha FEM) for mechanics problems using triangular meshes", *Journal of Computational Physics*, Published 20 June 2009, Vol. 228, Iss 11, pp. 4055-4087.
- 18 G.R. Liu, T. Nguyen-Thoi & K.Y. Lam, "An edge-based smoothed finite element method (ES-FEM) for static, free and forced vibration analyses of solids", *Journal of Sound and Vibration*, Published 6 March 2009, Vol. 320, Iss 4-5, pp. 1100-1130.
- 19 Cockburn, J. Gopalakrishnan, F. Li, N.C. Nguyen & J. Peraire, "Hybridization and postprocessing techniques for mixed eigenfunctions", *SIAM Journal on Numerical Analysis*, Published 24 June 2010, Vol. 48, No. 3, pp. 857-881.
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- 21 Cockburn, J. Gopalakrishnan, N.C. Nguyen, J. Peraire & F.-J. Sayas, "Analysis of HDG methods for Stokes flow", *Mathematics of Computation*, Accepted 2009.
- 22 N.C. Nguyen, J. Peraire and B. Cockburn, "A comparison of HDG methods for Stokes flow", *Journal of Scientific Computing*, Submitted, Online: DOI 10.107/s10915-010-9359-0.
- 23 G. Strang and Pavel Grinfeld, "Laplace eigenvalues on regular polygons: A series in $1/N$ ", *Transactions of the American Mathematical Society*, submitted.
- 24 N.C. Nguyen, J. Peraire and B. Cockburn, "An implicit high-order hybridizable discontinuous Galerkin method for the incompressible Navier-Stokes equations", *Journal of Computational Physics*, Submitted 2009.
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Conference Publication

- 1 G. R. Liu, "A cell-based smoothed point interpolation method (cs-pim) based on the g space theory and weakened weak (w2) formulation", The Third Asia-Pacific International Conference in Computational Methods in Engineering (ICOME2009), Nanjing, China, Oct. 18-22, 2009 (Plenary Lecture).
- 2 G. R. Liu, "A G space theory with discontinuous functions for weakened weak (w2) formulation of numerical methods", The 9th International Conference on Analysis of Discontinuous Deformation (ICADD9), Singapore, 24-26 November 2009 (Plenary Lecture).
- 3 G. R. Liu, "A weakened weak (W2) formulation for certified solutions with bounds, real-time computation and inverse analysis of biomechanics problems", International conference on computational and experimental Engineering and Science (ICCES09), Phuket, Thailand, 8-13 April 2009 (Keynote Lecture).
- 4 C. Chan, J. Ansel, Y.L. Wong, S. Amarasinghe & A. Edelman, "Autotuning Multigrid with PetaBricks", International Conference for High Performance Computing, Networking, Storage, and Analysis (SC), 2009.
- 5 J. Peraire, "High order discontinuous Galerkin methods for systems of conservation laws", iCME Colloquium (Institute for Computational and Mathematical Engineering), February 19, 2009, Stanford University.
- 6 J. Peraire, "Hybridized Discontinuous Galerking Methods", ICOSAHOM 09 (International Conference on Spectral and High Order Methods), Trondheim, Norway, June 22–26, 2009.
- 7 G. R. Liu, "Meshfree Methods for CFD problems", Fifth M.I.T. Conference on Computational Fluid and Solid Mechanics-- Focus: Advances in CFD, June 17-19, 2009 (Plenary Lecture).
- *8 M. Buffoni & K. Willcox, "Model Reduction Approaches for Reacting Flow Applications", AIAA 40th Fluid Dynamics Conference And Exhibit, Chicago, IL, June 2010. ([also appeared in FRP](#))
- 9 K. Willcox, "Model Reduction for Uncertainty Quantification and Decision-Making Under Uncertainty", Minisymposium on Model Reduction, SIAM 2009 Conference on Computational Science and Engineering, March 2009, Miami, FL.
- 10 K. Willcox, "Model Reduction for Uncertainty Quantification and Optimization of Large-Scale Systems", Plenary Talk, SIAM Conference on Applied Linear Algebra, October 2009, Monterey Bay-Seaside, CA.
- 11 K. Willcox, "Model Reduction for Uncertainty Quantification in Large-Scale Complex Systems", Seminar Series in Verification, UQ and Sensitivity Analysis, May 2009, Lawrence Livermore National Laboratory, Livermore, CA.

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SMA-2 PUBLICATIONS

- 12 K. Willcox, "Model Reduction for Uncertainty Quantification in Large-Scale Inverse Problems", NZIMA Workshop on Energy, Wind and Water, February 2009, University of Auckland, New Zealand.
- 13 G. R. Liu, "Weakened weak (W2) formulation for unified computational methods for solid mechanics problems", The Second International Symposium on Computational Mechanics (ISCM II) in conjunction with The Twelfth International Conference on the Enhancement and Promotion of Computational Methods in Engineering and Science (EPMESC XII), Hong Kong and Macau, 30 November – 3 December 2009 (Plenary Lecture).

Books

- 1 G.R. Liu, "Meshfree Methods – Moving beyond the finite element method", 2nd Edition, CRC Press, ISBN: 1420082094, Published 6 Oct 2009, Books.
- 2 G.R. Liu and T. Nguyen-Thoi, "Smoothed Finite Element Methods", CRC Press, ISBN: 9781439820278, Published 8 June 2010, Books.

(3) IUP-2: Advanced Optimization Methods: Theory and Computation for Band-Gap Optimisation

Journal Publications

- 1 A. Belloni, R. Freund & S. Vempala, "An Efficient Re-Scaled Perceptron Algorithm for Conic Systems", Mathematics of Operations Research, Published August 2009, Vol. 34, Iss 3, pp. 621-641.
- 2 R. Freund & J. Vera, "Equivalence of Convex Problem Geometry and Computational Complexity in the Separation Oracle Model", Mathematics of Operations Research, Published Nov 2009, Vol. 34, Iss 4, pp. 869-879.
- 3 X.Y. Zhao, D.F. Sun, and K.C. Toh, "A Newton-CG augmented Lagrangian method for semidefinite programming", SIAM Journal on Optimization, Published 27 Jan 2010, Vol. 20, Iss 4, pp. 1737-1765.
- 4 N.-H. Leung, and K.C. Toh, "An SDP-based divide-and-conquer algorithm for large scale noisy anchor-free graph realization", SIAM Journal on Scientific Computing, Published 16 Dec 2009, Vol. 31, Iss 6, pp. 4351-4372.
- 5 S. Yun, and K.C. Toh, "A coordinate gradient descent method for L1-regularized convex minimization", Computational Optimization and Applications, Accepted April 2009.
- 6 Y.J. Liu, D.F. Sun, and K.C. Toh, "An implementable proximal point algorithmic framework for nuclear norm minimization", Mathematical Programming, Accepted 13 July 2009.
- 7 K.C. Toh and S. Yun, "An accelerated proximal gradient algorithm for nuclear norm regularized least squares problems", Pacific Journal of Optimization, Accepted Nov 2009.
- 8 Lu Li, and K.C. Toh, "A polynomial-time inexact primal-dual infeasible path-following algorithm for convex quadratic SDP", Pacific Journal of Optimization, Accepted October 2009.
- 9 Z. Shen, K.C. Toh, and S. Yun, "An accelerated proximal gradient algorithm for frame based image restoration via the balanced approach", Pacific Journal of Optimization, Accepted Dec 2009.
- 10 C.J. Wang, D.F. Sun, and K.C. Toh, "Solving log-determinant optimization problems by a Newton-CG primal proximal point algorithm", SIAM Journal on Optimization, Accepted Sep 2009.
- 11 A.A. Ahmadi & P.A. Parrilo, "A convex polynomial that is not sos-convex", Convex & Nonsmooth Optimization, Submitted 3 Aug 2009 (15 pages).

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- 12 Lu Li and K.C. Toh, "An inexact interior point method for L1-regularized sparse covariance selection", *Mathematical Programming Computation*, Submitted February 2010.
- 13 J.A. De Loera, P.N. Malkin & P.A. Parrilo, "Computation with Polynomial Equations and Inequalities arising in Combinatorial Optimization", *Optimization & Control (Math .OC)*, Submitted 4 Sep 2009 (28 pages).
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- 15 X.Y. Zhao, and K.C. Toh, "Infeasible potential reduction algorithms for semidefinite programming", *SIAM Journal on Optimization*, Submitted.

Conference Publications

- 1 R. Freund, "Band Gap Optimization of Two-Dimensional Photonic Crystals Using Semi-Definite Programming", 10th U.S. National Congress for Computational Mechanics, Columbus, Ohio, 16 July 2009.
- 2 K.C. Toh, "Cluster Chair", 20th International Symposium on Mathematical Programming, Chicago, 23-28 Aug 2009.
- 3 R. Freund, "On the Primal-Dual Geometry of Level Sets in Linear and Conic Optimization", INFORMS National Meeting, 11 October 2009, San Diego.
- 4 R. Freund, "Primal-Dual Geometry of Level Sets and their Explanatory Value in Understanding Interior-Point Computation in Conic Convex Optimization", ETH Institute for Operations Research, 16 November 2009, Zurich, Switzerland & 18 November 2009, Judge School of Business, University of Cambridge, Cambridge, UK.

(4) IUP-3: Robust Optimization: A Tractable Approach to Address Optimization and Equilibrium Problems Under Uncertainty

Journal Publications

- 1 C. Wang, C.J. Ong and M. Sim, "Convergence properties of Constrained Linear System under MPC control law using affine disturbance feedback", *Automatica*, Published July 2009, Vol. 45, Iss 7, pp. 1715-1720.
- 2 C Wang, C.J. Ong, and M. Sim, "Model Predictive Control Using Segregated Disturbance Feedback", *IEEE Transactions on Automatic Control*, Published April 2010, Vol. 55, Iss 4, pp. 831-840.
- 3 D. Sui, C.J. Ong and L Feng, "A framework for multiple robust explicit MPC controllers for linear systems", *International Journal of Control*, Published August 2009, Vol. 82, No. 8, pp. 1414-1422.
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- 5 S. Kachani and G. Perakis, "A Dynamic Travel Time Models for Spillover", *Networks and Spatial Economics*, Published Dec 2009, Vol. 9, No. 4, pp. 595-618.
- 6 W. Chen & M. Sim, "Goal Driven Optimization", *Operations Research*, Published March 2009, Vol. 57, Iss 2, pp. 342-357.
- 7 K. Natarajan, D. Pachamanova and M. Sim, "Constructing Risk Measures from Uncertainty Sets", *Operations Research*, Published Sept 2009, Vol. 57, Iss 5, pp. 1129-1147.

SINGAPORE-MIT ALLIANCE SMA-2 PUBLICATIONS

- 8 A. Farahat and G. Perakis, "A Nonnegative Extension of the Affine Demand Function and Equilibrium Analysis for Multiproduct Price Competition", *Operations Research Letters*, Published July 2010, Vol. 38, Iss 4, pp. 280-286.
- 9 J. Goh and M. Sim, "Distributionally Robust Optimization and its Tractable Approximations", *Operations Research*, Accepted Oct 2009.
- 10 E. Adida and G. Perakis, "Dynamic pricing and inventory control: robust vs. stochastic uncertainty models; a computational study", *Annals of Operations Research*, Accepted January 2010.
- 11 N.G. Hall, Z. Long, J. Qi and M. Sim, "A Satisficing Model for Project Selection", *Management Science*, Submitted 2009.
- 12 R. Lobel and G. Perakis, "Network Dynamic Pricing Through Scenario Based Optimization", *Manufacturing & Service Operations Management*, Submitted 2010.
- 13 T. Huh, R. Levi, P. Rusmevichientong and J. Orlin, "Adaptive Data-Driven Inventory Control Policies Based on Kaplan-Meier Estimator", *Operations Research*, Submitted 26 Feb 2008.
- 14 M. Ang, Y-F. Lim and M Sim, "A Linear Storage-Retrieval Policy for Robust Warehouse Management", *Operations Research*, Submitted 2009.
- 15 R. Levi and C. Shi, "Randomized Cost-Balancing Policies for Stochastic Inventory Control Models with Fixed Costs", *Operations Research*, Submitted 2009.
- 16 D. Han, H.K. Lo, J. Sun and H. Yang, "Second-Order Cone Reformulation and the Price of Anarchy for Some Robust Nash Games", *Pacific Journal of Optimization*, Submitted 2008.
- 17 E. Adida and G. Perakis, "Loss of Profit and Capacity Effects in a Two-Tier Capacitated Supply Chain", *Production and Operations Management (POM)*, Submitted 2010.
- 18 C-K. Low, D. Pachamanova and M. Sim, "Skewness-Aware Asset Allocation: Relation to Utility Theory and Empirical Evidence", *Mathematical Finance*, Submitted 2009.
- 19 J. Goh and M. Sim, "Robust Optimization Made Easy with ROME", *Operations Research*, Submitted 2009.

Conference Publications

- 1 G. Perakis and W. Sun, "A Pricing Contract to Reduce Congestion and Improve Efficiency in Airports", *MSOM Conference Refereed Proceedings*, June 2009.
- 2 G. Perakis and W. Sun, "Congestion Pricing for Airport Efficiency", *Conference Refereed Proceedings TRISTAN VII*, accepted February 2010.
- 3 J. Kluberg and G. Perakis, "Loss of welfare in deregulated markets: an oligopolistic Cournot competition model", *MSOM Conference Refereed Proceedings*, June 2009.
- 4 R. Lobel and G. Perakis, "Network Dynamic Pricing through Scenario Based Optimization", *MSOM Conference Refereed Proceedings*, June 2009.

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SMA-2 PUBLICATIONS

MST programme (AY 2009/2010)

Number of Research Projects with publications: 1 FRP and 6 IUPs

(* appeared in 2 or more projects)

(A) Collaborative Publications with SMA-MIT Fellows

(1) FRP: Manufacturing Processes, Equipment and Controls for the Production of Polymer-based Microfluidic Devices

Journal Publications

- *1 D.E. Hardt, B.W. Anthony & S.B. Tor, "A teaching factory for polymer microfabrication –uFac", International Journal of Nanomanufacturing, Accepted 2010, To be published. (*also appeared in IUP-8*)
- *2 S.G. Li, T. Thorsen, Z.G. Xu, Z.P. Fang, J.H. Zhao & S.F. Yoon, "Microvalve Thickness and Topography Measurements in Microfluidic Devices by White Light Confocal Microscopy", Applied Optics, Published 10 Sep 2009, Vol. 48, No. 27/30 (27/20), pp. 5088-5094 & Virtual Journal for Biomedical Optics, Published 21 Oct 2009, Vol.4, Iss 11. (*also appeared in IUP-6*)
- *3 Z.G.Xu, V. Shilpiekandula, K. Youcef-Toumi & S.F.Yoon, "White-light scanning interferometer for absolute nano-scale gap thickness measurement", Optics Express, Published 11 Aug 2009, Vol.17, No.17, pp.15104-15117. (*also appeared in IUP-6*)
- 4 H.K. Taylor, M.R. Hale, Y.C.Lam & D.S. Boning, "A method for the accelerated simulation of microembossed topographies in thermoplastic polymers", Journal of Micromechanics and Microengineering, Published 11 May 2010, Vol. 20, no. 6, pp. 065001.
- 5 H.K. Taylor, Y.C. Lam & D.S.Boning, "An investigation of the detrimental impact of trapped air in thermoplastic microembossing", Journal of Micromechanics and Microengineering, Published 14 May 2010, Vol. 20, no. 6, pp. 065014.
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- *7 G. Fu, S.B. Tor, N.H. Loh & D.E. Hardt, "Fabrication of robust tooling for mass production of polymeric microfluidic devices", Journal of Micromechanics and Microengineering, Published 8 Jul 2010, Vol. 8, No. 20, pp. 085019. (*also appeared in IUP-8*)
- *8 B. Saha, E Liu, S.B. Tor, N.W. Khun, D.E. Hardt & J.H. Chun, "Replication performance of Si-N-DLC-coated Si micromolds in micro-hotembossing", Journal of Micromechanics and Microengineering, Published April 2010, Vol. 20, No. 4, pp. 045007. (*also appeared in IUP-8*)
- *9 G. Fu, S.B. Tor, N.H.Loh & D.E. Hardt, "Micro Hot-embossing of 316L Stainless Steel Microstructures", Applied Physics A: Materials Science and Processing, Published Dec 2009, Vol. 97, Iss 4, pp. 925-931. (*also appeared in IUP-8*)
- *10 B. Saha, E Liu, S.B. Tor, N.W. Khun, D.E. Hardt & J.H. Chun, "Anti-sticking behavior of DLC-coated silicon micromolds", Journal of Micromechanics and Microengineering, Published Oct 2009, Vol. 19, No. 10, pp. 105025. (*also appeared in IUP-8*)
- *11 Z.G. Xu, H.K. Taylor, D.S. Boning, S.F. Yoon & K.Youcef-Toumi, "Large-area and highresolution distortion measurement based on moiré fringe method for hot embossing process", Optics Express, Published Oct 2009, Vol. 17, No. 21, pp.18394-18407. (*also appeared in IUP-6*)
- 12 G. Fu, S.B. Tor, D.E. Hardt & N.H. Loh, "Effects of processing parameters on the microchannels replication in microfluidic devices fabricated by micro injection molding", Journal of Micromechanics and Microengineering, Submitted 2009.

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SMA-2 PUBLICATIONS

- 13 S.B. Tor, G. Fu, N. H. Loh & D. E. Hardt, "A universal development platform for the design and fabrication of polymeric microfluidic devices", Lab on a Chip, Submitted 2009.
- *14 S.B. Tor, G. Fu, N.H. Loh, B.Y. Tay & D.E. Hardt, "Metallic Mold Inserts for Fabrication of Polymer Microfluidic Devices", International Journal of Nanomanufacturing, Submitted 2010. ([also appeared in IUP-8](#))

Conference Publications

- *1 B. Saha, S.B. Tor, E. Liu, D.E. Hardt & J.H. Chun, "Improvement on Micro-mold Life and Duplication Quality via DLC Coatings", The Annual SMA Symposium, 19th January 2010, Singapore. ([also appeared in IUP-8](#))

(2) IUP-6: Fabrication of Nanometer Molds for Advanced Fluidics

Journal Publications

- *1 S.G. Li, T. Thorsen, Z.G. Xu, Z.P. Fang, J.H. Zhao & S.F. Yoon, "Microvalve Thickness and Topography Measurements in Microfluidic Devices by White Light Confocal Microscopy", Applied Optics, Published 10 Sep 2009, Vol. 48, No. 27/30 (27/20), pp. 5088-5094 & Virtual Journal for Biomedical Optics, Published 21 Oct 2009, Vol.4, Iss 11. ([also appeared in FRP](#))
- *2 Z.G.Xu, V. Shilpiekandula, K. Youcef-Toumi & S.F.Yoon, "White-light scanning interferometer for absolute nano-scale gap thickness measurement", Optics Express, Published 11 Aug 2009, Vol.17, No.17, pp.15104-15117. ([also appeared in FRP](#))
- *3 Z.G. Xu, H.K. Taylor, D.S. Boning, S.F. Yoon & K.Youcef-Toumi, "Large-area and highresolution distortion measurement based on moiré fringe method for hot embossing process", Optics Express, Published Oct 2009, Vol. 17, No. 21, pp.18394-18407. ([also appeared in FRP](#))

(3) IUP-8: A Pilot Factory for Batch Production of Microfluidic Devices

Journal Publications

- 1 B Saha, E Liu , S B Tor, N W Khun, D E Hardt and J H Chun, "Improvement in lifetime and replication quality of Si micromold using N:DLC:Ni coatings for microfluidic devices", Sensors & Actuators B: Chemical, Accepted 16 July 2010.
- *2 D.E. Hardt, B.W. Anthony & S.B. Tor, "A teaching factory for polymer microfabrication –uFac", International Journal of Nanomanufacturing, Accepted 2010, To be published. ([also appeared in FRP](#))
- *3 G. Fu, S.B. Tor, N.H. Loh & D.E. Hardt, "Fabrication of robust tooling for mass production of polymeric microfluidic devices", Journal of Micromechanics and Microengineering, Published 8 Jul 2010, Vol. 8, No. 20, pp. 085019. ([also appeared in FRP](#))
- *4 B. Saha, E Liu, S.B. Tor, N.W. Khun, D.E. Hardt & J.H. Chun, "Replication performance of Si-N-DLC-coated Si micromolds in micro-hotembossing", Journal of Micromechanics and Microengineering, Published April 2010, Vol. 20, No. 4, pp. 045007. ([also appeared in FRP](#))
- *5 G. Fu, S.B. Tor, N.H.Loh & D.E. Hardt, "Micro Hot-embossing of 316L Stainless Steel Microstructures", Applied Physics A: Materials Science and Processing, Published Dec 2009, Vol. 97, Iss 4, pp. 925-931. ([also appeared in FRP](#))
- *6 B. Saha, E Liu, S.B. Tor, N.W. Khun, D.E. Hardt & J.H. Chun, "Anti-sticking behavior of DLC-coated silicon micromolds", Journal of Micromechanics and Microengineering, Published Oct 2009, Vol. 19, No. 10, pp. 105025. ([also appeared in FRP](#))
- *7 S.B. Tor, G. Fu, N.H. Loh, B.Y. Tay & D.E. Hardt, "Metallic Mold Inserts for Fabrication of Polymer Microfluidic Devices", International Journal of Nanomanufacturing, Submitted 2010. ([also appeared in FRP](#))

SINGAPORE-MIT ALLIANCE SMA-2 PUBLICATIONS

Conference Publications

- *1 B. Saha, S.B. Tor, E. Liu, D.E. Hardt & J.H. Chun, "Improvement on Micro-mold Life and Duplication Quality via DLC Coatings", The Annual SMA Symposium, 19th January 2010, Singapore. ([also appeared in FRP](#))

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SMA-2 PUBLICATIONS

MST programme (AY 2009/2010)

(B) Non-collaborative Publications

(1) FRP: Manufacturing Processes, Equipment and Controls for the Production of Polymer-based Microfluidic Devices

Journal Publications

- 1 M. Mirkhalaf, S B Tor, V M Murukeshan, N H Loh and S W Lye, "Optimization of Compression Molding of Stand-alone Microlenses: Simulation and Experimental Results", Polymer Engineering & Science, Accepted 23 July 2010. (in press)
- *2 S.G. Li, J. Liu, N.T. Nguyen, Z.P. Fang & S.F. Yoon, "Measurement of Buried Undercut Structures in Microfluidic Devices by Laser Fluorescent Confocal Microscopy", Applied Optics, Published 11 Nov 2009, Vol. 48, Iss 33, pp.6432-6441. (*also appeared in IUP-6*)
- 3 M. Hale, T. Eusner & D.E. Hardt, "Process Robustness of Hot Embossing Microfluidic Devices", ASME Journal of Manufacturing Science, Published 14 June 2010, Vol. 132, pp. 030920, Technical Note.
- 4 V. Srivastava, S.A. Chester & L. Anand, "Thermally actuated shapememory polymers: Experiments, theory, and numerical simulations", Journal of The Mechanics and Physics of Solids, Published 16 Apr 2010, Vol. 58, Iss 8, pp. 1100-1124.
- 5 V. Srivastava, S.A. Chester, N.M. Ames & L. Anand, "A thermo-mechanically coupled large-deformation theory for amorphous polymers in a temperature range which spans their glass transition", International Journal of Plasticity, Published 18 Jan 2010, Vol. 26, Iss 8, pp. 1138-1182.
- 6 D.L. Henann, V. Srivastava, H.K., Taylor, M. Hale, D.E. Hardt & L. Anand, "Metallic glasses: viable tool materials for the production of surface microstructures in amorphous polymers by micro-hot-embossing", Journal of Micromechanics and Microengineering, Published 19 Oct 2009, Vol. 19, No. 11, pp. 115030.
- 7 Z.Y. Wang, Y.C. Lam, X. Chen & S.C. Joshi, "Viscosity corrections for concentrated suspension in capillary flow with wall slip", AIChE Journal, Published 2010, Vol. 56, Iss 6, pp1447-1455.
- *8 N.K. Tran, Y.C. Lam, C.Y. Yue & M.J. Tan, "Manufacturing of an aluminum alloy mold for micro-hot embossing of polymeric micro-devices", Journal of Micromechanics and Microengineering, Published 23 April 2010, Vol. 20, Iss 5, pp. 055020. (*also appeared in IUP-7*)
- 9 J. Meng, N.H. Loh, G. Fu, S.B. Tor & B.Y. Tay, "Replication and characterization of 316L stainless steel micro-mixer by micro powder injection molding", Journal of Alloys and Compounds, Published 30 Apr 2010, Vol. 496, Iss 1-2, pp. 293-299.
- 10 J. Meng, N.H. Loh, B.Y. Tay, G. Fu & S.B. Tor, "Tribological behavior of 316L stainless steel fabricated by micro powder injection molding", Wear, Published 9 Mar 2010, Vol. 268, Iss 7-8, pp.1013-1019.
- 11 M Mirkhalaf, S B Tor, V M Murukeshan, N H Loh and SW Lye, "Fabrication of a stand-alone polymer microlens: design of molding apparatus, simulation and experimental results", Journal of Micromechanics and Microengineering, Published Sep 2009, Vol. 19, No. 9, pp. 095005.
- 12 D.L. Henann & L. Anand, "Surface tension-driven shape-recovery of micro/nanometer-scale surface features in a Pt57.5Ni5.3Cu14.7P22.5 metallic glass in the supercooled liquid region: a numerical modeling capability", Mechanics and Physics of Solids, Submitted 24 July 2010.

Conference Publications

- 1 X. Chen, Y.C Lam & C.Y. Yue, "A Microstructurally Based Orthotropic and Transversely Isotropic Hyperelastic Constitutive Model", SMA Annual Symposium, 2009, Singapore.

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SMA-2 PUBLICATIONS

- 2 B. Anthony, D.E. Hardt, M. Hale & N. Zarrouati, "A Research Factory for Polymer Microdevices: muFac", Proc. SPIE Conference, 01-10, Photonics West, San Francisco, CA.
- *3 Tran N. K, Y.C. Lam, C.Y. Yue & M.J. Tan, "Aluminum alloy mold for micro-hot embossing of polymeric micro-devices", SMA Annual Symposium, 2010, Singapore. (*also appeared in IUP-7*)
- *4 Q. M.P. Nguyen, X. Chen, Y.C. Lam, C.Y. Yue & N.S. Ong, "Compressible flow of microinjection molding with mold surface roughness", SMA Annual Symposium, 2010, Singapore. (*also appeared in IUP-7*)
- 5 M. Hale & D.E. Hardt, "Development And Testing Of A Low-Cost Rapid-Cycle Hot Embossing System For Manufacturing Microscale Parts", Proceedings of the ASME 2009 International Mechanical Engineering Congress, 11-09, Lake Buena Vista, FL.
- *6 R. Jena, C.Y. Yue & Y.C. Lam, "Fabrication and characterization of microchannel imprinted on cyclic olefin copolymer (COC) by hot embossing technique", SMA Annual Symposium, 2009, Singapore. (*also appeared in IUP-7*)
- 7 N.H. Loh, S.B. Tor, G. Fu, B.Y. Tay, Y. Murakoshi & R. Maeda, "Fabrication of Micro-Components by Micro Powder Injection Molding", PIM 2009, 03-09, Orlando, FL.
- *8 G. Fu, S.B. Tor, N.H. Loh, B.Y. Tay and D.E. Hardt, "Fabrication of robust tooling for mass production of polymeric microfluidic devices", Euro-PM2009, 10-09, Copenhagen, Denmark & The Annual SMA Symposium 2010, 01-10, & Singapore. (*also appeared in IUP-8*)
- *9 R. Jena, C.Y. Yue & Y.C. Lam, "Influence of processing parameters on fabrication of COC polymer microfluidic device by hot embossing", International conference on Hi-Tech Materials (ICHTM-09), 2009, India, 11 – 13 February. (*also appeared in IUP-7*)
- *10 Sunanda Roy, C.Y. Yue & Y.C. Lam, "Surface Modification and Chemical Characteristics of Plasma treated Topas Surface : Application for Microfluidic Device", International conference on Hi-Tech Materials (ICHTM-09), 2009, India, 11 – 13 February. (*also appeared in IUP-7*)

(2) IUP-1: Dynamic Pricing and Revenue Management for Air Cargo Transportation

Journal Publications

- 1 Xu, J., Chen, S., Lin, B., and Bhatnagar, R., "Optimal Production and Rationing Policies of a Make-To-Stock Production System with Batch Demand and Backordering", Operations Research Letters, Published May 2010, Vol. 38, Iss 3, pp. 231-235.
- 2 Bhatnagar, R., and Teo C.C., "Role of Logistics in Enhancing Competitive Advantage: A Value Chain Framework for Global Supply Chains", International Journal of Physical Distribution and Logistics Management, Published 2009, Vol. 39, No.3, pp. 202-226.

(3) IUP-2: Design and Planning of Supply Chains for Emerging Industries

Conference Publications

- 1 Shirin Geranmayeh & Sivakumar, A.I., "Capacity analysis of critical hospital resources using a system dynamics approach", 35th annual ORAHS conference, 2009, pp. 2100-2108.

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SMA-2 PUBLICATIONS

(4) IUP-4: Quality / Quantity Research – Empirical and Numerical Studies

Journal Publications

- 1 Ang, A.T.H., Sivakumar, A.I. & Qi, C., "Criteria selection and analysis for single machine dynamic on-line scheduling with multiple objectives and sequence-dependent setups", *Computers and Industrial Engineering*, Published 2009, Vol. 56, Iss 4, pp. 1223-1231.
- 2 Mathirajan, M. & Sivakumar, A.I., "Scheduling a burn-in oven with non-agreeable release times and due dates", *International Journal of Operational Research*, Published 2009, Vol. 4, Iss 3, pp. 231-249.
- 3 Qing Fu, Sivakumar A.I. and Kunpeng Li, "Optimization of Buffer-Constrained Two-Machine Flowshop Scheduling with a Batch Processor", *International Journal of Production Research*, Submitted 2010.
- 4 Xianfei Jin, Kunpeng Li, and Sivakumar A.I., "Coordination of price and delivery time quotation with production scheduling decisions in a supply chain", *Manufacturing & Service Operations Management*, Submitted 2010.

Conference Publications

- 1 Kunpeng Li., Sivakumar A.I., Fu, Q. & Jin, X., "A case study for synchronized scheduling of manufacturing and air transportation in consumer electronics supply chain", *IEEM 2007: 2007 IEEE International Conference on Industrial Engineering and Engineering Management*, 2008, art. no. 4419468, pp. 1629-1633.
- 2 Xianfei Jin, Kunpeng Li, and Sivakumar A.I., "Coordination of price and lead time quotation with production scheduling decisions in a supply chain", *The First POMS-HK International Conference*, 30 December 2009, Proceedings.

(5) IUP-6: Fabrication of Nanometer Molds for Advanced Fluidics

Journal Publications

- *1 S.G. Li, J. Liu, N.T. Nguyen, Z.P. Fang & S.F. Yoon, "Measurement of Buried Undercut Structures in Microfluidic Devices by Laser Fluorescent Confocal Microscopy", *Applied Optics*, Published 11 Nov 2009, Vol. 48, Iss 33, pp.6432-6441. (*also appeared in FRP*)

(6) IUP-7: Manufacturing of Polymeric Microfluidic Devices – Die Making, Micro-hot Embossing and Micro-injection Molding

Journal Publications

- *1 N.K. Tran, Y.C. Lam, C.Y. Yue & M.J. Tan, "Manufacturing of an aluminum alloy mold for micro-hot embossing of polymeric micro-devices", *Journal of Micromechanics and Microengineering*, Published 23 April 2010, Vol. 20, Iss 5, pp. 055020. (*also appeared in FRP*)

Conference Publications

- *1 Tran N. K, Y.C. Lam, C.Y. Yue & M.J. Tan, "Aluminum alloy mold for micro-hot embossing of polymeric micro-devices", *SMA Annual Symposium*, 2010, Singapore. (*also appeared in FRP*)
- *2 Q. M.P. Nguyen, X. Chen, Y.C. Lam, C.Y. Yue & N.S. Ong, "Compressible flow of microinjection molding with mold surface roughness", *SMA Annual Symposium*, 2010, Singapore. (*also appeared in FRP*)

SINGAPORE-MIT ALLIANCE SMA-2 PUBLICATIONS

- *3 R. Jena, C.Y. Yue & Y.C. Lam, "Fabrication and characterization of microchannel imprinted on cyclic olefin copolymer (COC) by hot embossing technique", SMA Annual Symposium, 2009, Singapore. *(also appeared in FRP)*
- *4 R. Jena, C.Y. Yue & Y.C. Lam, "Influence of processing parameters on fabrication of COC polymer microfluidic device by hot embossing", International conference on Hi-Tech Materials (ICHTM-09), 2009, India, 11 – 13 February. *(also appeared in FRP)*
- 5 Y. C. Lam, "Simulation and Optimization of Plastic Injection Molding", Asian Workshop on Polymer Processing, Dec 2009, Malaysia. (Invited Keynote Lecture)
- *6 Sunanda Roy, C.Y. Yue & Y.C. Lam, "Surface Modification and Chemical Characteristics of Plasma treated Topas Surface : Application for Microfluidic Device", International conference on Hi-Tech Materials (ICHTM-09), 2009, India, 11 – 13 February. *(also appeared in FRP)*

(7) IUP-8: A Pilot Factory for Batch Production of Microfluidic Devices

Conference Publications

- *1 G. Fu, S.B. Tor, N.H. Loh, B.Y. Tay and D.E. Hardt, "Fabrication of robust tooling for mass production of polymeric microfluidic devices", Euro-PM2009, 10-09, Copenhagen, Denmark & The Annual SMA Symposium 2010, 01-10, & Singapore. *(also appeared in FRP)*

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

CPE programme (AY 2009/2010)

Number of Research Projects with publications: 1 FRP and 3 IUPs

(* appeared in 2 or more projects)

(A) Collaborative Publications with SMA-MIT Fellows

(1) FRP: Molecular Engineering of Bio / Chemical Pathways & Process Science for the Pharmaceutical Industry

Journal Publications

- 1 Zhou ZZ, Xiao YC, Hatton TA & Chung T-S, "Effects of spacer arm length and benzoation on enantioseparation performance of beta-cyclodextrin functionalized cellulose membranes", *Journal Membrane Science*, Published 1 Sep 2009, Vol. 339, Iss 1-2, pp. 21-27.
- 2 Yusdy, M.Yap and Daniel I. C. Wang, "Immobilization of L-Lactate Dehydrogenase on Magnetic Nanoclusters for Chiral Synthesis of Pharmaceutical Compounds", *Biochemical Engineering Journal*, Published 15 Dec 2009, Vol. 48, Iss 1, pp. 13-21.
- 3 Sun SP, Wang KY, Rajarathnam D, Hatton TA & Chung T-S, "Polyamide-imide Nanofiltration Hollow Fiber Membranes with Elongation-Induced Nano-Pore Evolution", *AIChE Journal*, Published 2010, Vol. 56, Iss 6, pp. 1481-1494.
- 4 Wen Wang, Yi Xu, Daniel I. C. Wang and Zhi Li, "Recyclable Nanobiocatalyst for Enantioselective Sulfoxidation: Facile Fabrication and High Performance of Chloroperoxidase-Coated Magnetic Nanoparticles with Iron Oxide Core and Polymer Shell", *Journal of the American Chemical Society*, Published 24 Aug 2009, Vol. 131, Iss 36, pp. 12892–12893.
- 5 Watson, D. A., Su, M.; Teverovskiy, G.; Zhang, Y.; Garcia-Fortanet, J.; Kinzel, T. & Buchwald, S., "Formation of ArF from a Pd(II) Complex: Catalytic Conversion of Aryl Triflates to ArF", *Science*, Published 25 Sep 2009, Vol. 325, No. 5948, pp. 1661-1664.
- 6 Tan, T.Y., JY Lee and DIC Wang, "Morphosynthesis of Gold Nanoplates in Polypeptide Multilayer Films", *Journal of Physical Chemistry C*, Published Nov 2009, Vol. 113, Iss 25, pp. 10877-10895.
- 7 Xie, JP, Q. Zhang, W. Zhou, J.Y. Lee, and Daniel I. C. Wang, "Template-Free Synthesis of Porous Platinum Networks of Different Morphologies", *Langmuir*, Published Oct 2009, Vol. 25, Iss 11, pp. 6454-6459.
- 8 Zhou ZZ, Xiao YC, Hatton TA & Chung T-S, "Novel Membrane Processes for the Enantiomeric Resolution of Tryptophan by Selective Permeation Enhancements", *AIChE Journal*, Submitted 2009.
- 9 Wei Zhang, Weng Lin Tang, Daniel I. C. Wang, and Zhi Li, "Tandem Biocatalyst Systems for Selective Sequential Oxidations of Methylene Group into Ketone with Cofactor Recycling" *Angewandte Chemie International Edition*, Submitted 2009.
- 10 Sun SP, Wang KY, Hatton TA & Chung T-S, "Novel Polyamide-imide/Cellulose acetate Dual-layer Hollow Fiber Membranes for Nanofiltration", *Journal Membrane Science*, Submitted 2009.
- 11 S. H. S. Lee, T. A. Hatton & S. A. Khan, "Continuous-flow microfluidic protein chromatography with functionalized field-responsive nanoparticles as a moving separation phase", *Lab on a Chip*, Submitted 2009.
- 12 Y.C. Tang, Heng-Phon Too and G. Stephanopoulos, "Information theoretic analysis of cell signaling identifies modulators of cell apoptotic response", *Manuscript*, Submitted 2009.
- 13 P. K. Ajikumar, W. Xiao, K. Tyo, E. Leonard, Y. Wang, O. Mucha, H. P. Too, B. Pfeifer & G. Stephanopoulos, "Isoprenoid pathway optimization for Taxol precursor overproduction in *Escherichia coli*", *Manuscript*, Submitted 2010.

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

Conference Publications

- 1 Wei Zhang, Daniel I. C. Wang, and Zhi Li, "Development of Tandem Biocatalysts Systems for Selective Sequential Oxidations with Cofactor Regeneration", SMA 11st Annual Symposium, 01-10, Singapore.
- 2 Zhengzhong Zhou, Youchang Xiao, T.S. Chung & T. Alan Hatton, "Effects of Spacer Arm Length and Benzoation On Enantioseparation Performance of α -Cyclodextrin Functionalized Cellulose Membranes", AIChE Annual Meeting, 11-09.
- 3 Wen Wang, Daniel I. C. Wang, and Zhi Li, "Fabrication of Recyclable Nanobiocatalyst for Enantioselective Biotransformation", SMA 11st Annual Symposium, 01-10, Singapore.
- 4 Wen Wang, Daniel I. C. Wang, and Zhi Li, "Immobilization of Enzymes on Functionalized Iron Oxide Core/Shell Magnetic Nanoparticles for Efficient Biocatalysis", ChemBiotech'09-10, 01-10, Singapore.
- 5 Wen Wang, Daniel I. C. Wang, and Zhi Li, "Immobilization of Enzymes on Functionalized Magnetic Nanoparticles for Efficient Biocatalysis", NSTI Nanotech, 05-09, Houston, USA.
- 6 Yusdy, Patel SR, Yap MGS & Wang DIC., "Magnetic Nanoclusters in Biocatalysis and Cofactor Regeneration", The 5th International Symposium on Nanomanufacturing, 09-09 & SMA 11st Annual Symposium, 01/10, Singapore, 2009.
- 7 P. K. Ajikumar, W. Xiao, K. Tyo, Y. Wang, O. Mucha, E. Leonard, H. P. Too, B. Pfeifer & G. Stephanopoulos, "Metabolic engineering of isoprenoid metabolism in *E. coli* for overproduction of Taxol precursors", AIChE National Meeting 2009, April 2009.
- 8 Shi Peng Sun, Kai Yu Wang, D. Rajarathnam, T. Alan Hatton & Tai-Shung Chung, "Molecular Engineering of Nanoporous Hollow Fiber Membranes for NF and Bio-Molecular Separations", AIChE Annual Meeting, 11-09.
- 9 Wei Zhang, Daniel I. C. Wang, and Zhi Li, "Novel Tandem Biocatalysts Systems for Practical Selective Sequential Oxidations", 239th ACS National Meeting & Exposition, 03-10, San Francisco, USA.
- 10 Wen Wang, Daniel I. C. Wang, and Zhi Li, "Recyclable Magnetic Nanobiocatalyst for Efficient Biocatalysis", 239th ACS National Meeting & Exposition, 03-10, San Francisco, USA.

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SMA-2 PUBLICATIONS

CPE programme (AY 2009/2010)

(B) Non-collaborative Publications

(1) FRP: Molecular Engineering of Bio / Chemical Pathways & Process Science for the Pharmaceutical Industry

Journal Publications

- 1 Jatin, Misra, Ilias Alevizos, Daehee Hwang, George Stephanopoulos, and Gregory Stephanopoulos, "Linking physiology and transcriptional profiles by quantitative predictive models", *Biotechnology & Bioengineering*, Published 1 Sep 2007, Vol. 98, Iss 1, pp. 252-260.
- 2 Yong-Su Jin & Gregory Stephanopoulos, "Multi-dimensional gene target search for improving lycopene biosynthesis in *Escherichia coli*", *Metabolic Engineering*, Published 17 Apr 2007, Vol. 9, pp. 337-347.
- 3 D. Dendukuri & Doyle, P.S., "The Synthesis and Assembly of Polymeric Microparticles Using Microfluidics", *Advanced Materials*, Published 2 Jun 2010, Vol. 21, pp. 4071-4086.
- 4 Lee CT, Smith KA & Hatton TA, "Small-Angle Neutron Scattering Study of the Micellization of Photosensitive Surfactants in Solution and in the Presence of a Hydrophobically Modified Polyelectrolyte", *Langmuir*, Published 2009, Vol. 25, Iss. 24, pp. 13784-13794.
- 5 Panda P, Yuet KP, Hatton TA & Doyle PS, "Tuning Curvature in Flow Lithography: A New Class of Concave/Convex Particles", *Langmuir*, Published 2009, Vol. 25, Iss 10, pp. 5986-5992.
- 6 Bong, K. W., Chapin, S. and Doyle P. S., "Magnetic Barcoded Hydrogel Microparticles", *Langmuir*, Published 23 Feb 2010, Vol. 26, Iss 11, pp. 8008-8014.
- 7 Curtiss P. Schneider & Bernhardt L. Trout, "Investigation of Cosolute-Protein Preferential Interaction Coefficients: New Insight into the Mechanism by Which Arginine Inhibits Aggregation", *Journal of Physical Chemistry B*, Published 23 Jan 2009, Vol. 113, Iss 7, pp. 2050-2058.
- 8 K. E. J. Tyo, P. K. Ajikumar and G. Stephanopoulos, "Stabilized gene duplication enables long-term selection-free heterologous pathway expression", *Nature Biotechnology*, Published 26 Jul 2009, Vol. 27, Issue 8, pp. 760 – 765.
- 9 T. Lutke-Eversloh, C.N.S. Santos and G. Stephanopoulos, "Perspectives of biotechnological productions of L-tyrosine and its applications", *Applied Microbiology and Biotechnology*, Published 30 Oct 2007, Vol. 77, No. 4, pp. 751-762.
- *10 Jianguo Li, Manju Garg, Dhawal Shah, and Raj Rajagopalan, "Solubilization of aromatic and hydrophobic moieties by arginine in aqueous solutions", *Journal of Chemical Physics*, Published 5 Aug 2010, Vol. 133, Iss 5, pp. 054902. (*also appeared in IUP-1*)
- *11 Sivashangari Gnanasambandam & Raj Rajagopalan, "Growth Morphology of α -Glycine Crystals in Solution Environments: An Extended Interface Structure Analysis", *CrystEngComm*, Published 5 Mar 2010, Vol 12, No. 6, pp. 1740 – 1749. (*also appeared in IUP-1*)
- 12 R. Sondjaja, T.A. Hatton & K.C. Tam, "Clustering of Magnetic Nanoparticles Using a Double Hydrophilic Block Copolymer, Poly(thyleneoxide)-b-Poly(acrylicacid)", *Journal of Magnetism and Magnetic Materials*, Published Aug 2009, Vol. 321, Iss 16, pp. 2393-2397.
- *13 S. Duraiswamy & S. A. Khan, "Droplet based microfluidic synthesis of anisotropic metal nanocrystals", *Small*, Published Aug 2009, Vol. 5, Iss 2, pp. 2828-2834, Highlighted as Frontispiece. (*also appeared in IUP-2*)
- 14 K.P. Yuet, Hwang, D.K., Haghgoie, R., and Doyle, P.S., "Multifunctional Superparamagnetic Janus Particles", *Langmuir*, Published Feb 2010, Vol. 26, Iss 6, pp. 4281-4287.

SINGAPORE-MIT ALLIANCE SMA-2 PUBLICATIONS

- 15 Bong, K. W., Bong, K. T., Pregibon, D. C. and Doyle, P. S., "Hydrodynamic Focusing Lithography", *Angewandte Chemie International Edition*, Published Jan 2010, Vol. 49, Iss 1, pp. 87-90.
- 16 Vikramaditya G. Yadav & Gregory Stephanopoulos, "Reevaluating synthesis by biology", *Current Opinion in Microbiology*, Published June 2010, Vol. 13, Iss 3, pp. 371-376.
- 17 Panda P, Yuet, K.P., Dendukuri, D., Hatton, T.A. & Doyle, P.S., "Temporal response of an initially deflected PDMS channel", *New Journal of Physics*, Published Nov 2009, Vol. 11, art. no. 115001.
- 18 Diwakar Shukla & Bernhardt L. Trout, "Molecular Computations of Preferential Interaction of Proteins", *Journal of Physical Chemistry B*, Published Sep 2009, Vol. 113, Iss 37, pp. 12546-12554.
- 19 Wei Zhang, Tang Weng Lin, Zunsheng Wang, and Zhi Li, "Regio- and Stereo-selective Biohydroxylations with A Recombinant Escherichia Coli Expressing P450_{pyr} Monooxygenase of Sphingomonas Sp. HXN-200", *Advanced Synthesis & Catalysis*, Submitted 2009.
- 20 Diwakar Shukla & Bernhardt L. Trout, "On the interaction of Arginine with Proteins and the mechanism by Which it inhibits aggregation", *Journal of Physical Chemistry B*, Submitted 2009.
- 21 Diwakar Shukla & Bernhardt L. Trout, "A Molecular Perspective on the Preferential Interaction of Arginine with Proteins", *Journal of Physical Chemistry B*, Submitted 2009.
- 22 Z. Barikbin, S. A. Khan, P. Parthiban, M. T. Rahman, S. H. S. Lee, V. Jain, S. Duraiswamy & A. Rane, "Compound Droplet Microfluidics for On-Drop Separations and Sensing", *Lab on a Chip*, Submitted 2009.

Conference Publications

- *1 Sivashangari Gnanasambandam & Raj Rajagopalan, "Effect of Solvent on the Morphology of α -Glycine Crystals: An Interface Structure Analysis", *British Association for Crystal Growth (BACG)*, 6 Sep 2009, Bristol, United Kingdom (U.K.). ([also appeared in IUP-1](#))
- *2 Markely, L.R.A. & DIC Wang, "High-Throughput Quantification of Glycoprotein Sialylation", *SMA 11st Annual Symposium*, 01/10, Singapore & *240th ACS National Meeting*, Submitted 2010, Boston. ([also appeared in IUP-2](#))
- 3 Dhawal Shah, Shaikh Abdul Rajjak and Raj Rajagopalan, "How arginine, as an excipient, affects the stability of concentrated protein formulations?", *Proteins and Peptide Conference*, Beijing 03-10.
- 4 K. W. Bong, D. C. Pregibon and P. S. Doyle, "Lock Release Lithography", *AIChE Annual Conference*, 11-09.
- 5 K. W. Bong, D. C. Pregibon and P. S. Doyle, "Lock Release Lithography for 3D and Composite Microparticles", *Micro-TAS*, 10-09.
- 6 Diwakar Shukla, Curtiss P. Schneider and Bernhardt L. Trout, "Mechanism by Which Arginine Inhibits Protein Aggregation", *ACS National Meeting*, San Francisco, 03-10.
- 7 Xuexiang Fan, Md Taifur Rahman & Mark Saeys, "Mechanistic investigation of CO insertion in the carbonylation of aryl chlorides", *AIChE annual conference*, 10-09.
- 8 P. Panda, Ki Wan Bong, Kai P. Yuet, T. Alan Hatton & Patrick S. Doyle, "Microfluidics-Based Lithography for Fabricating Complex Microparticles and Their Directed Assembly", *AIChE Annual Meeting*, 11-09.
- 9 Diwakar Shukla & Bernhardt L. Trout, "Preferential Interaction of Arginine with Proteins", *ACS National Meeting*, San Francisco, 03-10.

SINGAPORE-MIT ALLIANCE

SMA-2 PUBLICATIONS

(2) IUP-1: Mechanistic Understanding of Crystallization of Model Compounds for the Pharmaceutical Industry

Journal Publications

- *1 Jianguo Li, Manju Garg, Dhawal Shah, and Raj Rajagopalan, "Solubilization of aromatic and hydrophobic moieties by arginine in aqueous solutions", *Journal of Chemical Physics*, Published 5 Aug 2010, Vol. 133, Iss 5, pp. 054902. ([also appeared in FRP](#))
- *2 Sivashangari Gnanasambandam & Raj Rajagopalan, "Growth Morphology of α -Glycine Crystals in Solution Environments: An Extended Interface Structure Analysis", *CrystEngComm*, Published 5 Mar 2010, Vol 12, No. 6, pp. 1740 – 1749. ([also appeared in FRP](#))

Conference Publications

- *1 Sivashangari Gnanasambandam & Raj Rajagopalan, "Effect of Solvent on the Morphology of α -Glycine Crystals: An Interface Structure Analysis", British Association for Crystal Growth (BACG), 6 Sep 2009, Bristol, United Kingdom (U.K.). ([also appeared in FRP](#))

(3) IUP-2: High Through-Put Sensing in Pharmaceuticals Production

Journal Publications

- 1 Khan, S. A. and Duraiswamy, S., "Microfluidic emulsions with dynamic compound drops", *Lab on a Chip*, Published 22 May 2009, Vol. 9, Iss 13, pp. 1840-1842.
- *2 S. Duraiswamy & S. A. Khan, "Droplet based microfluidic synthesis of anisotropic metal nanocrystals", *Small*, Published Aug 2009, Vol. 5, Iss 2, pp. 2828-2834, Highlighted as Frontispiece. ([also appeared in FRP](#))

Conference Publications

- *1 Markely, L.R.A. & DIC Wang, "High-Throughput Quantification of Glycoprotein Sialylation", SMA 11st Annual Symposium, 01/10, Singapore & 240th ACS National Meeting, Submitted 2010, Boston. ([also appeared in FRP](#))
- 2 Daniel I.C. Wang, "50th Anniversary of Biotechnology and Bioengineering: It happened before you were born", XVI Biochemical Engineering Conference, July 2009, Keynote Lecture, Burlington, VT.
- 3 Khan, S. A. and Duraiswamy, S., "Microfluidic Emulsions with Dynamic Compound Drops", International Conference on Microreaction Technology (IMRET 11), Kyoto, Japan, 8-10 March 2010.

(4) IUP-4: Mechanism Elucidation and Application of Global Transcriptional Machinery Engineering (gTME) to the Modulation of the Isoprenoid Pathway for Biosynthesis of Pharmaceuticals

Book Chapters

- 1 Wan Guoqiang, Zhou Lihan and Too Heng Phon, "Molecular neurobiology of glial cell line derived neurotrophic factor (GDNF) family of ligands and receptor complexes", *Neurogenesis, Neurodegeneration and Neuroregeneration*, Published 2010, pp. 201-243, ISBN: 978-81-308- 0388-3, Editor: B L Tang.
- 2 Wan Guoqiang, Lim Qing-En & Heng Phon Too, "High performance quantification of mature microRNAs by real-time RT-PCR using deoxyuridine-incorporated oligonucleotides and hemi-nested primers", *RNA*, Published 2010, Vol. 16, pp. 1436-1445.

SINGAPORE-MIT ALLIANCE SMA-2 PUBLICATIONS

- 3 Li Foong Yoong , Guoqiang Wan & Heng-Phon Too, "GDNF-induced cell signaling and neurite outgrowths are differentially mediated by GFRalpha1 isoforms", *Molecular and Cellular Neuroscience*, Published Jul 2009, Vol. 41, Iss 4, pp. 464-473.
- 4 Lihan Zhou, Qing-En Lim, Guoqiang Wan & Heng-Phon Too, "Normalization with genes encoding ribosomal proteins but not GAPDH provides an accurate quantification of gene expressions in neuronal differentiation of PC12 cells", *BMC Genomics*, Published 29 Jan 2010, Vol. 11, pp. 75.