

Preliminary Program

MMB 2009 Conference
Fairmont le Château Frontenac
Quebec City, Quebec, CANADA
April 1 - 3, 2009

Guide to Understanding Paper Numbering

Each paper in the technical program is assigned a unique number which indicates when the paper is presented. The number of each paper is shown before the paper title.

Typical Paper Number: **W3P.14**

The first letter (i.e. W) indicates the day of the Conference:

W = Wednesday
T = Thursday
F = Friday

The second number (i.e., 3) indicates what time during the day the session is being presented:

1 = Early Morning
2 = Mid Morning
3 = Early Afternoon
4 = Late Afternoon

The third letter (i.e., P) indicates the type of the paper:

K = Keynote
P = Poster

The fourth number (i.e. 14) indicates the number of the paper in the session, in sequence, starting at 1.

Wednesday, April 1, 2009

07:30 Registration

09:00 Welcome and Introduction

Sylvain Martel, *École Polytechnique Montréal, CANADA*

09:30 Keynote Speaker I - Microbiology, Diagnostics

Session Chair:

O. Guenat, *École Polytechnique Montréal, CANADA*

**W1K.1 REVOLUTIONIZING MEDICINE THROUGH
"RAPID DNA-BASED DIAGNOSTICS"**

M.G. Bergeron

Université Laval, CANADA

10:30 Flash Poster Session 1 - Microtechnologies Advances

Session Chair:

R. Keynton, *University of Louisville, USA*

**W2P.1 A MICROFLUIDIC CHIP TO STUDY PROTEIN SELF- ASSEMBLY
BY X-RAY SCATTERING METHODS: EXAMPLE OF THE SILK
FORMATION PROCESS**

A. Martel¹ and C. Riekel²

¹*Stanford University, USA* and ²*European Synchrotron Radiation Facility, FRANCE*

W2P.2 A RAPID TEMPLATELESS PROTOTYPING OF PDMS BIO-CHIP

H.-B. Liu and H.-Q. Gong

Nanyang Technological University, SINGAPORE

**W2P.3 A SOFT-POLYMER PIEZOELECTRIC BIMORPH CANTILEVER-
ACTUATED PERISTALTIC MICROPUMP**

N.J. Graf and M.T. Bowser

University of Minnesota, USA

W2P.4 BIOLOGICALLY INSPIRED DRUG DELIVERY MICROROBOTS

W.R. Hesse, D.M. Casale, B. Milton, P.K. Fink, and M.J. Kim

Drexel University, USA

**W2P.5 CLUSTER ASSEMBLED NANOSTRUCTURED TiO₂ COATING
AS NOVEL BIOMATERIAL FOR HAEMATOPOIETIC CELL
ADHESION ON MICROFABRICATED DEVICES**

R. Carbone, E. Barborini, A. Zanardi, M. De Marni, S. Venturini,
M. Leccardi, and D. Bandiera

Tethis srl, ITALY

- W2P.6 DEVELOPMENT OF A NOVEL NANOROBOTIC SYSTEM FOR THE CHARACTERIZATION AND MANIPULATION OF BIOMATERIALS
M. Weigel-Jech and S. Fatikow
Carl von Ossietzky Universität of Oldenburg, GERMANY
- W2P.7 DNA SEPARATION BY MICRO- AND NANOSTRUCTURES
N. Kaji¹, T. Yasui¹, M. Tokeshi¹, Y. Horiike², and Y. Baba^{1,3,4}
¹*Nagoya University, JAPAN*, ²*National Institute for Materials Science, JAPAN*,
³*National Institute of Advanced Industrial Science and Technology (AIST), JAPAN*,
and ⁴*Institute for Molecular Science, JAPAN*
- W2P.8 DYNAMICS OF SHEAR-INDUCED ATP RELEASE FROM RED BLOOD CELLS
J. Wan, W.D. Ristenpart², and H.A. Stone¹
¹*Harvard University, USA* and ²*University of California, Davis, USA*
- W2P.9 ELECTROKINETIC TRANSPORT IN SUSPENDED MICROCHANNELS FABRICATED FROM SACRIFICIAL POLYMER FIBERS
S.M Berry, S.D. Cambron, T.J. Roussel, R.W. Cohn, and R.S. Keynton
University of Louisville, USA
- W2P.10 FABRICATION OF VERTICAL MICROELECTRODES ON A CMOS CHIP
Z. Lu, J. El-Fouladi, Y. Savaria, and S. Martel
École Polytechnique de Montréal, CANADA
- W2P.11 FRICTION ENHANCEMENT BY MICROPATTERNING ROBOT-LEGS ON LARGE-INTESTINAL SURFACES FOR PADDLE-TYPE COLON ENDOSCOPE MICROROBOT
S.-H. Lee, S. Hwang, H.-N. Kim, and K.-Y. Suh
Seoul National University, KOREA
- W2P.12 HIGH Q SNOM PROBES FOR NC-AFM IN LIQUID
J.M. LeDue, G.M. Lopez Ayon, and P Grutter
McGill University, CANADA
- W2P.13 IMPROVING THE RELIABILITY AND COMPLEXITY OF ADVANCED ELECTROWETTING-BASED DIGITAL MICROFLUIDIC DEVICES
D. Brassard, L. Clime, F. Normandin, and T. Veres
National Research Council of Canada, CANADA
- W2P.14 INTEGRATED ACOUSTOPHORETIC-MAGNETOPHORETIC SEPARATION DEVICE FOR RAPID MULTI-TARGET CELL SORTING
J.D. Adams¹, P. Thévoz², U. Kim¹, H. Bruus³, and H.T. Soh¹
¹*University of California, Santa Barbara, USA*, ²*École Polytechnique Fédérale de Lausanne, SWITZERLAND*, and ³*Danmarks Tekniske Universitet, DENMARK*
- W2P.15 MAGNETOTACTIC BACTERIA IN THREE-WAY JUNCTIONS WITH STATE SWITCH
E. Shechter and S. Martel
École Polytechnique de Montréal, CANADA

- W2P.16 MICROFLUIDIC PLATFORM UTILIZING AN ACOUSTICALLY ACTIVATED PUMPING MECHANISM FOR POINT-OF-CARE DIAGNOSTICS
A.R. Tovar and A.P. Lee
University of California, Irvine, USA
- W2P.17 NANOFLUIDIC PLATFORM FOR LABEL-FREE PROTEINS DETECTION
N.F.Y. Durand, F. Wildhaber, and P. Renaud
École Polytechnique Fédérale de Lausanne, SWITZERLAND
- W2P.18 NOVEL MATERIAL PROCESSING FOR PATCH CLAMPING APPLICATIONS
S. Wilson^{1,2}, W. Pfleging¹, A. Welle¹, M. Torge¹, and P. Kirby²
¹FZK, GERMANY and ²Cranfield University, UK
- W2P.19 PDMS HYBRID MULTIPLE MOLDING: A METHOD TO FABRICATE NONPLANAR MICROFLUIDIC DEVICES
W. Rhie and T. Higuchi
University of Tokyo, JAPAN
- W2P.20 POLYPYRROLE MICROACTUATORS ON CARBON ELECTRODES FOR LAB ON A CHIP APPLICATIONS
F. Lefevre, R. Izquierdo, and S.B. Schougaard
Université du Québec à Montréal, CANADA
- W2P.21 POTENTIALLY IMPLANTABLE MEMBRANE-, MEDIATOR-, COFACTOR-LESS GLUCOSE/OXYGEN BIOFUEL CELLS
V. Coman¹, R. Ludwig², W. Harreither³, D. Haltrich³, L. Gorton¹, T. Ruzgas⁴, and S. Shleev^{4,5}
¹Lund University, SWEDEN, ²Research Centre Applied Biocatalysis, AUSTRIA, ³BOKU-University of Natural Resources and Applied Life Sciences Vienna, AUSTRIA, ⁴Malmö University, SWEDEN, and ⁵A.N. Bach Institute of Biochemistry, RUSSIA
- W2P.22 PRE-PROGRAMMED MICROFLUIDIC DEVICES FOR AUTOMATED ASSAYS
B. Mosadegh, C.H. Kuo, Y.C. Tung, Y.S. Torisawa, and S. Takayama
University of Michigan, USA
- W2P.23 RAPID PROTOTYPING OF MICROFLUIDIC SYSTEMS USING PDMS/TAPE COMPOSITE
J. Kim, R. Surapanini, and B.K. Gale
University of Utah, USA
- W2P.24 RIBOSOME DISPLAY AND DIP-PEN NANOLITHOGRAPHY FOR NOVEL FABRICATION OF PROTEIN NANOARRAYS
J.D. Kim, M. Kim, and H. Jung
Yonsei University, KOREA
- W2P.25 SIMPLE FABRICATION METHOD FOR HARD MICROFLUIDIC DEVICE MADE OF INDUSTRIAL ADHESIVES
K. Mogi and T. Fujii
University of Tokyo, JAPAN

- W2P.26 SINGLE-MASK MULTIDIRECTIONAL PHOTOLITHOGRAPHY WITH MULTIPLE RESIST COAT FOR MULTI-LAYERED MICROFLUIDIC NETWORKS
T. Suzuki¹, Y. Hirabayashi², K. Terao³, I. Kanno², M. Washizu^{3,4}, and H. Kotera^{2,3}
¹Kagawa University, JAPAN, ²Kyoto University, JAPAN, and
³Japan Science Technology Agency (JST), JAPAN, and ⁴University of Tokyo, JAPAN
- W2P.27 SPATIALLY PHYSIOLOGICAL MICROFLUIDIC METASTASIS ON A CHIP
S.P. Cavnar, J.W. Song, A.C. Walker, K.E. Luker, M. Gupta, Y.-C. Tung, G.D. Luker, and S. Takayama
University of Michigan, USA
- W2P.28 SU-8 AS A PEEL-OFF MASK FOR RELIABLE METALLIZATION ON PDMS FOR AN ELECTRO-ENZYMATIC GLUCOSE SENSOR
J.N. Patel, B. Kaminska, B.L. Gray, and B.D. Gates
Simon Fraser University, CANADA
- W2P.29 SUB-MICRON PROTEIN PATTERNING TECHNOLOGY BASED ON ELECTRICAL-POTENTIAL ACTIVATION
C.-H. Lin, C.-W. Lu, and C.-T. Lin
National Taiwan University, TAIWAN
- W2P.30 THE CONCENTRATION EFFECT OF MAGNETIC IRON OXIDE NANOPARTICLES ON TEMPERATURE CHANGE FOR HYPERTHERMIC DRUG RELEASE APPLICATIONS VIA AC MAGNETIC FIELD
S.N. Tabatabaei and S. Martel
École Polytechnique de Montréal, CANADA
- W2P.31 THE GENERATION OF BIOCHEMICAL GRADIENTS IN A MICROFLUIDIC STAGNANT ZONE
M.A. Qasaimeh, R. Safavieh, and D. Juncker
McGill University, CANADA
- W2P.32 THREE-DIMENSIONAL TRACKING OF MICROSYSTEM-CONTROLLED FREE-FLYING INSECTS
H. Sato and M.M. Maharbiz
University of California, Berkeley, USA
- W2P.33 ULTRALOW STRESS SU-8 PINS FOR USE IN ANTIBODY MICROARRAY SPOTTING
R. Safavieh, M. Qasaimeh, M. Mirzaei, M. Pla Roca, and D. Juncker
McGill University, CANADA
- W2P.34 ZETA POTENTIAL MODULATION AND SYNCHRONIZATION WITH AC ELECTRIC FIELD FOR RECTIFIED ELECTROOSMOTIC FLOW
W.-I. Wu, P.R. Selvaganapathy, and C.Y. Ching
McMaster University, CANADA

11:30 Poster Session 1

12:30 Lunch

14:00 Flash Poster Session 2 - Microtechnologies Advances and Biotechnology Applications

Session Chair:

S. Martel, *École Polytechnique Montréal, CANADA*

W3P.1 A HETERO-SHAPED MICRO FLUIDIC CHANNEL FOR MICRO VALVE AND PUMP APPLICATIONS

B.P. Mun, S.K. Yoo, S.-K. Lee, S. Yang, and J.H. Lee

Gwangju Institute of Science and Technology (GIST), *KOREA*

W3P.2 A MICROFLUIDIC DEVICE FOR PEPTIDES/PROTEINS PURIFICATION BASED ON STIMULI-RESPONSIVE STATIONNARY PHASE

A.M. Gué, G. Szirbik, D. Moussa-Ragueh, G. Paumier, F. Nepveu, and J. Sudor

Université de Toulouse, FRANCE

W3P.3 A MICROFLUIDIC DEVICE FOR THE RAPID CHIP BASED ELECTRICAL DETECTION OF DNA

T. Schüler¹, R. Kretschmer¹, M. Urban², W. Fritzsche², and R. Möller¹

¹*Friedrich Schiller University, GERMANY* and

²*Institute of Photonic Technology, GERMANY*

W3P.4 AN INSULATOR-BASED DIELECTROPHORESIS SILICON MICROCHIP FOR CELL TRAPPING

P. Zellner, H. Shafiee, M. Sano, R. Davalos, and M. Agah

Virginia Tech, USA

W3P.5 AN ITEGRAED MICROFLUIDIC NUCLEIC ACID EXTRACTION SYSTEM

J. Kim, M. Johnson, P. Hill, R.S. Sonkul, J. Kim, and B.K. Gale

University of Utah, USA

W3P.6 BIOLOGICAL IMPLICATIONS OF PDMS MATERIAL PROPERTIES

K.J. Regehr, M. Domenech, J.T. Koepsel, K.C. Carver, S.J. Ellison-Zelski,

W.L. Murphy, L.A. Schuler, E.T. Alarid, and D.J. Beebe

University of Wisconsin, Madison, USA

W3P.7 CELL-BASED TOXICOLOGICAL PLATFORM WITH INTEGRATED K⁺-SELECTIVE MICROELECTRODES FOR CELL DEATH MONITORING

L. Chancé, C. Miville-Godin, A. Leblanc-Hotte, E. Hamel, and O.T. Guenat

École Polytechnique de Montréal, CANADA

W3P.8 CHIP INTEGRATION WITH FLEXIBLE PARYLENE POCKET

R. Huang and Y.C. Tai

California Institute of Technology, USA

- W3P.9 COMBINATORIAL CELL MICROENVIRONMENT GENERATOR
R.L. Smith¹, R. Burgess², and S.D. Collins¹
¹University of Maine, USA and ²Jackson Laboratory, USA
- W3P.10 DEVELOPMENT OF MICROREACTORS FOR
CONTINUOUS GLUCOSE MONITORING
B.-U. Moon, A.J.M. Schoonen, B.H.C. Westerink, and E. Verpoorte
University of Groningen, THE NETHERLANDS
- W3P.11 DIGITAL MICROFLUIDIC-BASED ARRAY FOR
SURFACE PLASMON RESONANCE IMAGING
L. Malic¹, T. Veres², and M. Tabrizian¹
¹McGill University, CANADA and ²National Research Council, CANADA
- W3P.12 DOUBLE LAYER BASED MICROFLUIDIC DILUTION
GENERATOR FOR DRUG SCREENING
K. Lee¹, C. Kim², J.Y. Kang², and K.W. Oh¹
*¹State University of New York, USA and
²Korea Institute of Science and Technology, KOREA*
- W3P.13 ESTROGEN EXTRACTION FROM MICRODROP CLINICAL
SAMPLES BY DIGITAL MICROFLUIDICS
N.A. Mousa¹, M.J. Jebrail², H. Yang², M. Abdelgawad², P. Metalnikov³,
R.F. Casper¹, and A.R. Wheeler²
*¹Samuel Lunenfeld Research Institute, CANADA, ²University of Toronto, CANADA,
and ³Ontario Cancer Biomarker Network, CANADA*
- W3P.14 HIGH RESOLUTION MICROFLUIDIC REFRACTOMETER
FOR BIOMEDICAL APPLICATIONS
R. St-Gelais, J. Masson, and Y.-A. Peter
École Polytechnique de Montréal, CANADA
- W3P.15 IMMUNO-PILLAR CHIP FOR MULTIPLEX IMMUNOASSAY
M. Tokeshi¹, M. Ikami¹, N. Kaji¹, and Y. Baba^{1,2,3}
*¹Nagoya University, JAPAN, ²National Institute of Advanced Industrial Science and
Technology (AIST), JAPAN, and ³Institute for Molecular Science, JAPAN*
- W3P.15 MICROFLUIDIC CHARACTERIZATION OF
TEMPERATURE-DEPENDENT BIOMOLECULAR BINDING
T.H. Nguyen, R. Pei, M. Stojanovic, and Q. Lin
Columbia University, USA
- W3P.17 MICROFLUIDIC SIZE-DEPENDENT CELL SEPARATION
S. Sugaya and M. Seki
Chiba University, JAPAN
- W3P.18 MICROMIXER DESIGN USING COMPUTER SIMULATION
Z. Zhang, C. Yim, M. Lin, and X. Cao
*¹National Research Council, CANADA, ²University of Ottawa, CANADA, and
³Canadian Food Inspection Agency, CANADA*

- W3P.19 MODEL LIPID MEMBRANE ARRAYS IN MICROFLUIDICS FOR STUDYING BIOPHYSICAL ROLES OF SPHINGOMYELINASES
L. Chao¹, T.A. Hatton¹, A.P. Gast², and K.F. Jensen¹
¹Massachusetts Institute of Technology, USA and ²Lehigh University, USA
- W3P.20 NUMERICAL MODELING OF LIQUID DROPLETS IN EWOD DEVICES
L. Clime, D. Brassard, and T. Veres
National Research Council, CANADA
- W3P.21 PATTERN FORMATION IN A SYNTHETIC MICROBIAL PATHWAY DRIVEN BY A MICROFLUIDIC PLATFORM
T. Kim, W.J. Holtz, J. Park, J.D. Keasling, and M.M. Maharbiz
University of California, Berkeley, USA
- W3P.22 RESEARCH ON A MICRO ENZYME SENSOR CHIP WITH MICRO THREE-DIMENSIONAL PILLAR STRUCTURES
T. Okazaki, F. Oohira, N. Miyanishi, S. Shimamoto, and T. Suzuki
Kagawa University, JAPAN
- W3P.23 REVERSIBLE ELECTROPORATION ON A MICROCHIP
H.B. Kim¹, Y.S. Choi², H.S. Kim³, J.K. Park², and J.H. Yi³
¹Solco Biomedical Co. Ltd., KOREA, ²Korea Advanced Institute of Science and Technology, KOREA, and ³Konkum University, KOREA
- W3P.24 SORTING IRREGULAR AND ROD-SHAPED LIVE CELLS BY CONTINUOUS FLOW, DETERMINISTIC MICROFLUIDICS
K.J. Morton¹, D.W. Inglis², K. Louthback³, J.C. Sturm³, S.Y. Chou³, and R.H. Austin³
¹National Research Council Canada, CANADA, ²Macquarie University, AUSTRALIA, and ³Princeton University, USA
- W3P.25 TOWARD FASTER BACTERIAL MICRO-ACTUATORS
N. Mokrani, M. Mohammadi, and S. Martel
École Polytechnique de Montréal, CANADA
- W3P.26 TOWARDS A DROPLET-BASED MICROFLUIDIC PLATFORM WITH SQUID READOUT FOR MAGNETIC IMMUNOASSAYS
V. Schaller¹, A. Sanz-Velasco¹, A. Kalabukhov¹, J.F. Schneiderman¹, F. Öisjöen¹, A. Jesorka¹, A. Prieto Astalan², P. Enoksson¹, and D. Winkler¹
¹Chalmers University of Technology, SWEDEN and ²Imego Institute, SWEDEN
- W3P.27 TRAPPING ESCHERICHIA COLI CELLS IN ELECTROACTIVE MICROWELL ARRAY
S.H. Kim, T. Yamamoto, D. Fourmy, and T. Fujii
University of Tokyo, JAPAN

15:00 **Poster Session 2**

16:00 **Keynote Speaker II - Complex Biological Networks**

W4K.2 USING MICROFLUIDICS TO UNDERSTAND HOW SPATIAL EFFECTS
CAN CONTROL DYNAMICS OF COMPLEX NETWORKS

R. Ismagilov

University of Chicago, USA

17:00 **Conference Adjourns for the day**

18:00 **Reception in the Rose Room of the Fairmont le Château Frontenac**

Thursday, April 2, 2009

08:30 Keynote Speaker III - *C. Elegans*

Session Chair:

E. Meng, *University of Southern California, USA*

T1K.3 DECONSTRUCTING TOUCH SENSATION USING THE NEMATODE CAENORHABDITIS ELEGANS

M.B. Goodman

Stanford University, USA

09:30 Keynote Speaker IV - *C. Elegans*

Session Chair:

Y.-A. Peter, *École Polytechnique Montréal, CANADA*

T1K.4 FEMTOSECOND LASER NANOSURGERY LAB-ON-A-CHIP FOR DECRYPTING THE GENETIC MAKEUP OF NERVE REGENERATION IN C. ELEGANS

A. Ben-Yakar

University of Texas, Austin, USA

10:30 Flash Poster Session 3 - Biotechnology Applications and Detection Technologies

Session Chair:

A. Aksan, *University of Minnesota, USA*

T2P.1 AN IMPLANTABLE LOW-COST MULTILAYER SCREEN-PRINTED CARBON THICK-FILM STRAIN SENSOR

C.A. Gutierrez, A. Cho, J. Geathers, L. Yu, T. Abram, and E. Meng

University of Southern California, USA

T2P.2 CARBON NANOTUBE ELECTRODES TOWARDS MULTI-SITE RECORDING IN MYOCYTES

A.O. Fung¹, W. Foster¹, Y. Wang¹, L. Chen², S. Jin², and J.W. Judy¹

¹*University of California, Los Angeles, USA* and

²*University of California, San Diego, USA*

T2P.3 CELL MANIPULATION WITH SINGLE-WALLED CARBON NANOTUBES UNDER A MAGNETIC FIELD

S. Park, M. Cha, and J. Lee

Seoul National University, KOREA

T2P.4 DEBYE LENGTH FREE FIELD EFFECT TRANSISTOR BY USING SMART GEL VOLUME PHASE TRANSITION

A. Matsumoto¹, N. Sato¹, T. Saskata¹, K. Kataoka¹, and Y. Miyahara^{1,2}

¹*University of Tokyo, JAPAN* and ²*National Institute for Materials Science, JAPAN*

- T2P.5 DEVELOPMENT OF A CALCIUM-ISFET ARRAY DEDICATED TO ENDOCRINE CELLS HIGH-THROUGHPUT ANALYSIS
J.W. Park¹, N. Pereira Rodrigues¹, O. Ducloux¹, B. Charlot², T. Fujii¹, and H. Fujita¹
¹University of Tokyo, JAPAN and ²Universite Montpellier, FRANCE
- T2P.6 DEVELOPMENT OF HIGH-DENSITY SURFACE MICROELECTRODE ARRAYS FOR HIGH SPATIAL RESOLUTION CARDIAC MAPPING
H. Dong¹, S.C. Koenig¹, D.J. Dossall², R.E. Ideker², J.F. Naber¹, and R.S. Keynton¹
¹University of Louisville, USA and ²University of Alabama, USA
- T2P.7 EFFECT OF PASSIVATION LAYER ON REAL TIME IMPEDANCE ANALYSIS OF MAMMALIAN CELLS
M. Nikkhah¹, S.N. Sreedharan¹, J.S. Strobl², and M. Agah¹
¹Virginia Tech, USA and
²Edward Via Virginia College of Osteopathic Medicine, USA
- T2P.8 ELECTROOSMOTIC DOSAGE CONTROL FOR MICROINJECTION IN A LAB-ON-A-CHIP FORMAT
A. Noori and P.R. Selvaganapathy
McMaster University, CANADA
- T2P.9 IMPLANTABLE FLEXIBLE THIN-FILM AMORPHOUS SILICON TRANSISTORS
H.-W. Lo and Y.-C. Tai
California Institute of Technology, USA
- T2P.10 INTEGRATING WHOLE TRANSCRIPTOME ASSAYS ON A LAB-ON-A-CHIP FOR SINGLE CELL GENE PROFILING
L. Dauphinot¹, N. Bontoux², T. Vitalis², V. Studer², L. Mahmoudian¹, Y. Chen³, J. Rossier², and M.-C. Potier¹
¹Hôpital de la Pitié-Salpêtrière, FRANCE,
²Ecole Supérieure de Physique et de Chimie Industrielles (ESPCI), FRANCE and
³Centre National de la Recherche Scientifique (CNRS), FRANCE
- T2P.11 INVESTIGATION OF THE TARGETED NUCLEAR DELIVERY USING PEPTIDE COATED QUANTUM DOTS
C.W. Kuo, N. Singh, J.-Y. Shiu, and P. Chen
Academia Sinica, TAIWAN
- T2P.12 ION-SELECTIVE MICROELECTRODE INTEGRATED IN A PDMS MICROFLUIDIC PLATFORM FOR THE DETECTION OF EXTRACELLULAR POTASSIUM EFFLUX
C. Miville-Godin, L. MacQueen, S. Bychkov, M.R. Wertheimer, and O.T. Guenat
École Polytechnique de Montréal, CANADA
- T2P.13 LOCAL IMMOBILIZATION OF QUANTUM DOTS IN A MICROCHANNEL FOR THE DEVELOPMENT OF A POINT OF CARE BIOSENSOR
B. Bouabdallaoui¹, A.K. Suresh², J.L. Nadeau², Y.-A. Peter¹, and O. Guenat¹
¹École Polytechnique de Montréal, CANADA and ²McGill University, CANADA

- T2P.14 LOW-COST MICROFLUIDIC COULTER COUNTER
A.L. McPherson and G.M. Walker
University of North Carolina, Chapel Hill and North Carolina State University, USA
- T2P.15 MEDICAL DEVICE FOR THE EVALUATION OF PLATELET
ACTIVATION FROM WHOLE BLOOD SAMPLES
Y. Martin, A. Caro, M. Lépine, and P. Vermette
Université de Sherbrooke, CANADA
- T2P.16 MICROFABRICATED GLASS DEVICES FOR SINGLE CELL
IMMOBILIZATION IN MOUSE ZYGOTE MICROINJECTION
X. Liu and Y. Sun
University of Toronto, CANADA
- T2P.17 MICROFLUIDIC PERFUSION SYSTEM FOR CULTURING
AND IMAGING OF YEAST CELL MICROARRAYS AND
RAPIDLY EXCHANGING MEDIA
M. Mirzaei, S. Ghorbanian, R. Safavieh, A. Queval, M. Pla-Roca, and D. Juncker
McGill University, CANADA
- T2P.18 ONLINE DETECTION OF CYTOKINES FOR MONITORING
CELLULAR STRESS IN CELL CULTURES
S. Pasche¹, M. Giazzon¹, N. Matthey¹, G.J. Oostingh², A. Duschl², and G. Voirin¹
¹*Centre Suisse d'Electronique et de Microtechnique (CSEM) SA, SWITZERLAND*
and ²*University of Salzburg, AUSTRIA*
- T2P.19 OPTIMIZATION OF SANDWICH ELISA MICROARRAY WITH
THE TAGUCHI METHOD FOR DETECTING CANCER BIOMARKERS
W. Luo, M. Pla-Roca, and D. Juncker
McGill University, CANADA
- T2P.20 RAPID BIOTOXIN IMMUNOASSAYS USING DRY-STORED
MICROFLUIDIC DEVICES IN RAPIDX PLATFORM
Y.-C. Wang, G.J. Sommer, M.L. Markel, A.K. Singh, and A.V. Hatch
Sandia National Laboratories, USA
- T2P.21 SPECIFIC MICRO-BIOPSY DEVICE FOR CELLS SAMPLING
P. Caillat¹, F. Martin¹, D. Ratel², F. Berger², and M. Cosnier¹
¹*CEA LETI MINATEC, FRANCE* and ²*Nanomédecine et Cerveau, FRANCE*
- T2P.22 STUDY OF CELL ACTIVITY BY MODULATING OXYGEN
MICRO-ENVIRONMENT IN MINIATURIZED
CELL-BASED MICROCHIPS
N. Pereira Rodrigues, O. Ducloux, P.-E. Poleni, H. Fujita, and T. Fujii
University of Tokyo, JAPAN
- T2P.23 THZ MICROSCOPIC INVESTIGATION ON LIVING CELLS
A. Treizebre, B. Bocquet, D. Legrand, J. Mazurier
University of Lille, FRANCE

11:30 Poster Session 3

12:30 Lunch

14:00 Flash Poster Session 4 - Detection Technologies

Session Chair:

M. Wertheimer, *École Polytechnique Montréal, CANADA*

T3P.1 A MEMS-BASED MICROSYSTEM FOR POINT-OF-CARE
MEDICAL DIAGNOSTICS

P. Ortiz¹, N. Keegan¹, J. Spoors¹, J. Hedley¹, A. Harris¹, J. Burdess¹, R. Burnett¹,
M. Biehl², W. Haberer², T. Velten², M. Solomon³, A. Campitelli³, and C.J. McNeil¹
¹Newcastle University, UK, ²Fraunhofer Institute for Biomedical Engineering (IBMT),
GERMANY, and ³MiniFAB Pty Ltd., AUSTRALIA

T3P.2 A MULTI-FIELD CHIP FOR ELECTROTAXIS STUDY OF LUNG
CANCER CELL WITH DIFFERENT METASTASIS POTENTIAL

J.Y. Cheng^{1,2}, C.W. Huang^{1,3}, and T.H. Young³
¹Academia Sinica Taiwan, TAIWAN, ²National Taiwan Ocean University, TAIWAN,
and ³National Taiwan University, TAIWAN

T3P.3 A TISSUE-BASED MICROFLUIDIC SYSTEM FOR PRECLINICAL
TOXICOLOGY AND CHEMOTHERAPY STUDIES: ANOTHER
'SMALL' STEP TOWARDS PERSONALIZED MEDICINE

S.M. Hattersley, J. Woods, A. Webster, C.E. Dyer, S.J. Haswell, and J. Greenman
University of Hull, UK

T3P.4 AN INTEGRATED MICROFLUIDIC DEVICE TO ISOLATE
LEUKOCYTES FROM WHOLE BLOOD

P. Shah, M. Dimaki, and W.E. Svendsen
Technical University of Denmark, DENMARK

T3P.5 CELL MIGRATION GUIDED BY DOUBLE-LAYERED MICRO PILLAR
ARRAY DEVICE (dMPAD) WITH VARIABLE STIFFNESS

S. Lee, J. Hong, M. Cha, and J. Lee
Seoul National University, KOREA

T3P.6 CULTURING OF CELLS ON PATTERNED
SELF-PRIMING GLASS SURFACES

K. Kolari, A. Hokkanen, P. Heimala, and M. Perälä
VTT Technical Research Center of Finland, FINLAND

T3P.7 DESIGN OF NOVEL MICROFLUIDIC DEVICES TO EXAMINE HYPOXIC PANCREATIC
ISLET METABOLISM THROUGH QUANTITATIVE
FLUORESCENCE MICROSCOPY

A.Y.K. Ming¹, J.E. Verity², and J.V. Rocheleau^{1,2}
¹University of Toronto, CANADA and ²University Health Network, CANADA

- T3P.8 DEVELOPMENT OF AN AMPEROMETRIC ANALYSIS SENSOR CHIP FOR SPECIFIC DETECTION OF D-ALLOSE
N. Miyanishi¹, S. Nakakita¹, H. Okuma², K. Izumori¹, and J. Hirabayashi¹
¹Kagawa University, JAPAN and ²Toyo University, JAPAN
- T3P.9 FULLY AUTOMATED MICROINJECTION SYSTEM: FROM SORTING, SINGULARIZING, INJECTING, TO COLLECTING
S.F. Graf and H.F. Knapp
Centre Suisse d'Electronique et de Microtechnique (CSEM) SA, SWITZERLAND
- T3P.10 IN SILICO AND IN VITRO CHARACTERIZATION OF RECURRENT ACTIVITY IN PATTERNED NEURAL NETWORKS
R.M. Stoner, C. Withers, A. Vishwanathan, and H.C. Zeringue
University of Pittsburgh, USA
- T3P.11 ISOLATION AND GROWTH OF CELLS IN ELECTRIC FIELD TRAPS
W.M. Arnold
Industrial Research Limited and Victoria University, NEW ZEALAND
- T3P.12 MEASURING THRESHOLDS FOR TOUCH SENSATION IN C. ELEGANS
J.C. Doll¹, S. Muntwyler², F. Beyeler², S. Geffeney¹, M.B. Goodman¹,
B.J. Nelson², and B.L. Pruitt¹
¹Stanford University, USA and ²ETH Zürich, SWITZERLAND
- T3P.13 MECHANICAL BEHAVIOR OF INDIVIDUAL MAMMALIAN CELLS MEASURED BY ELECTRO-DEFORMATION
L.A. MacQueen, M.D Buschmann, and M.R. Wertheimer
Ecole Polytechnique de Montreal, CANADA
- T3P.14 MICROCANTILEVER ARRAYS WITH PHOTONIC READOUT FOR BIOSENSING
G.P. Nordin, S. Kim, J.W. Noh, W. Hu, R. Anderson, B. Haslam, W. Dahlquist, and H.B. Dong
Brigham Young University, USA
- T3P.15 MICROFLUIDIC SHEAR STRESS EFFECTS ON MIGRATION AND ORIENTATION OF HUMAN UMBILICAL VEIN ENDOTHELIAL CELLS
Y.Y. Chiang¹, P.C. Tsai¹, S.W. Hwang², and L.S. Huang¹
¹National Taiwan University, TAIWAN, and
²Food Industry Research and Development Institute, TAIWAN
- T3P.16 ON-CHIP MICROMECHANICAL TESTING SYSTEM FOR SINGLE CELL MECHANICS
V. Mukundan and B.L. Pruitt
Stanford University, USA
- T3P.17 PATTERNED ELECTROPORATION OF GENE CONSTRUCTS INTO ZEBRAFISH EMBRYOS USING MICROFABRICATED INTERFACES
T. Bansal¹, J. Lenhart¹, C. Duan¹, and M.M. Maharbiz²
¹University of Michigan, Ann Arbor, USA and
²University of California, Berkeley, USA

- T3P.18 STRUCTURAL CHANGES IN NANOPORE-ENCAPSULATED LYSOZYME
E. Reátegui and A. Aksan
University of Minnesota, USA
- T3P.19 STUDY OF AUTOMATED EMBRYO MANIPULATION USING DYNAMIC MICROARRAY:
TRAPPING, CULTURE AND COLLECTION
H. Kimura, H. Nakamura, K. Iwai, T. Yamamoto, S. Takeuchi, Y. Sakai, and T. Fujii
University of Tokyo, JAPAN
- T3P.20 SURFACE TREATMENT STRATEGIES FOR MICROFLUIDIC DEVICES
TOWARDS LONGITUDINAL PC12 NEURONAL CELL STUDIES
T.Q. Hoang¹, L.J. Ho¹, K. Swertfager¹, A. Gill², K. Malhotra³, C. Jones¹,
J. Chen¹, and E. Meng¹
¹*University of Southern California, USA,*
²*Massachusetts Institute of Technology, USA, and* ³*Cornell University, USA*
- T3P.21 TERAHERTZ BIOMEMS FOR ENZYMATIC CATALYSIS MONITORING
A. Abbas, A. Trezeibre, N. Bourzgui, D. Guillochon, D. Vercaigne-Marko,
P. Supiot, and B. Bocquet
University of Lille, FRANCE
- T3P.22 THE INVESTIGATION OF THE PROXIMATE EFFECT OF TIME-VARIANT MAGNETIC
FIELD ON THE GROWTH OF IN-VITRO HELA AND
PC-12 CELLS USING ON-GLASS SPIRAL INDUCTOR
Y.C. Chen¹, C.C. Chen¹, W.T. Tu², Y.T. Cheng¹, and F.G. Tseng²
¹*National Chiao Tung University, TAIWAN and* ²*National Tsing Hua University, TAIWAN*
- T3P.23 WHAT RHYTHM DO PROSTATE CANCER CELLS LIKE?
MICROFLUIDIC STUDIES OF DIRECTED MIGRATION
Y.-K. Chung, S.G. Allen, S. Nixdorf, K.J. Pienta, and S. Takayama
University of Michigan, USA

15:00 **Poster Session 4**

16:00 **Keynote Speaker V - Cell Engineering**

Session Chair:

Y. Miyahara, *National Institute for Materials Science (NIMS), JAPAN*

T2K.5 ADHESION AND MECHANOSENSING AT CELL-CELL JUNCTIONS

D. Leckband¹, Q. Shi¹, N. Wang¹, F. Chowdhury¹, and J. de Rooij²

¹*University of Illinois, Urbana-Champaign, USA and*

²*Hubrecht Institute, THE NETHERLANDS*

17:00 **Conference Adjourns for the day**

18:00 **Conference Banquet at the Petit Seminaire Chapel**

Friday, April 3, 2009

08:30 Keynote Speaker VI - Cell Engineering

Session Chair:

S. Takayama, *University of Michigan, USA*

F1K.6 TENSEGRITY AND BIOLOGICAL DESIGN:
MECHANICAL ENGINEERING OF LIVING CELLS

D.E. Ingber

Wyss Institute for Biologically Inspired Engineering at Harvard University, USA

09:30 Keynote Speaker VII - Cell Engineering

Session Chair:

T. Fujii, *University of Tokyo, JAPAN*

F1K.7 NANOTECH-BASED CELL SHEET ENGINEERING FOR
REGENERATIVE MEDICINE

M. Yamato

Tokyo Women's Medical University, JAPAN

10:30 Flash Poster Session 5 - Tissue Engineering Applications

F2P.1 A SMALL-SCALE BIOREACTOR FOR THE ON-LINE MONITORING
OF CELL BIOENERGETICS: APPLICATION TO CANCER IMMUNITY

I. Hammami¹, J. Chen¹, V. Bronte², G. De Crescenzo¹, and M. Jolicoeur¹

¹*École Polytechnique de Montréal, CANADA* and ²*Istituto Oncologico Veneto, ITALY*

F2P.2 ADHESION OF HUMAN U937 MONOCYTES TO NITROGEN-RICH
ORGANIC THIN FILMS: NOVEL INSIGHTS INTO THE
MECHANISM OF CELLULAR ADHESION

P.-L. Girard-Lauriault¹, F. Truica-Maracescu¹, A. Petit², H.T. Wang²,
J. Antoniou², F. Mwale², and M.R. Wertheimer¹

¹*École Polytechnique de Montréal, CANADA* and ²*McGill University, CANADA*

F2P.3 COMPARISON OF THE GROWTH KINETICS OF HEPATOCARCINOMA
CELLS IN A MICROFLUIDIC BIOREACTOR AND PETRI DISHES

J.M. Prot, R. Baudoin, L. Griscom, and E. Leclerc

Centre National de la Recherche Scientifique, FRANCE

F2P.4 CONTROLLED CELLULAR GROWTH BY SUPERHYDROPHOBIC MICROSTRUCTURED
SURFACES ON IMPLANTABLE
BIODEGRADABLE POLYMER SUBSTRATE

N. Garg, R. Tran, J. Yang, and H. Moon

University of Texas, Arlington, USA

F2P.5 DIRECT-WRITE FABRICATION OF MICROVASCULAR-SCALE
POLYMER FIBER SCAFFOLD FOR ENDOTHELIAL CELL GROWTH

S.M. Berry, D.A. Hilgart, S.P. Warren, A.T. Schworer, A.S. Gobin,

R.W. Cohn, and R.S. Keynton

University of Louisville, USA

- F2P.6 DYNAMICS OF PRESYNAPTIC PROTEIN RECRUITMENT INDUCED BY LOCAL PRESENTATION OF ARTIFICIAL ADHESIVE CONTACTS
F.S. Sanchez, P. Thstrup, P. Grutter, and D. Colman
McGill University, CANADA
- F2P.7 ENHANCED IMMOBILIZATION OF EPIDERMAL GROWTH FACTOR FOR TISSUE ENGINEERING APPLICATIONS
C. Boucher^{1,2}, B. Liberelle¹, M. Jolicoeur¹, Y. Durocher², and G. De Crescenzo¹
¹*École Polytechnique de Montréal, CANADA* and
²*National Research Council, CANADA*
- F2P.8 INCORPORATION OF TGF- β 1 IN A MICROFLUIDIC DEVICE TO ENHANCE PRIMARY HEPATOCYTE FUNCTIONS
C. Zhang¹, S.M. Chia², S.M. Ong¹, S. Zhang¹, D. van Noort¹, and H. Yu^{1,2}
¹*National University of Singapore, SINGAPORE* and
²*Singapore-Massachusetts Institute of Technology Alliance, SINGAPORE*
- F2P.9 INTEGRATING POLYURETHANE CULTURE SUBSTRATES INTO MULTILAYER PDMS MICRODEVICES
C. Moraes, Y.K. Kagoma, B.M. Beca, R.L.M. Tonelli-Zasarsky, Y. Sun, and C.A. Simmons
University of Toronto, CANADA
- F2P.10 LONG-TERM MAINTENANCE OF AN IMMORTAL CELL LINES IN A MICROFLUIDIC PLATFORM
A. Vishwanathan, H.C. Zeringue
University of Pittsburgh, USA
- F2P.11 MICROFLUIDIC PROBE FOR DIRECT-WRITE OF 3D CELL SCAFOLDS FOR TISSUE ENGINEERING OF SOFT TISSUES
S. Ghorbanian, M.A. Qasaimeh, M. Mirzaei, D. Juncker
McGill University, CANADA
- F2P.12 MICROSTRUCTURED CELL CULTURE CHIPS WITH INTEGRATED NANOTOPOGRAPHY
S. Giselbrecht¹, M. Reinhardt¹, A. Schleunitz², E. Gottwald¹, and R. Truckenmüller³
¹*Forschungszentrum Karlsruhe, GERMANY*,
²*Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, GERMANY*,
and ³*University Twente, THE NETHERLANDS*
- F2P.13 NANOPILLAR ARRAY FOR THE MEASUREMENT OF CELLULAR ADHESION FORCES
J.Y. Shiu, C.-W. Kuo, and P. Chen
Academia Sincia, TAIWAN

- F2P.14 PDMS MICROSYSTEM EXPLOITING POLYMER MEMBRANES FOR IMPROVED EXPERIMENTAL CONTROL IN METABOLISM STUDIES USING INTESTINAL AND LIVER SLICES
P.M. van Midwoud, G.M.M. Groothuis, M.T. Merema, and E. Verpoorte
University of Groningen, THE NETHERLANDS
- F2P.15 PPE:IN COATING ON PET FILMS ENHANCES HUVEC ADHESION AND RETENTION UNDER FLOW
A. Gigout, A. Major, P.-L Girard-Lauriault, M.R. Wertheimer, S. Lerouge, and M. Jolicoeur
University of Montreal, CANADA
- F2P.16 SYNCHRONIZED MECHANICAL AND ELECTRICAL STIMULATION OF PRIMARY HEART CELLS WITH A STRETCHABLE MICROELECTRODE ARRAY
R. Taylor¹, S.J. Lue¹, K. Gumerlock¹, G. Fajardo¹, G. Higgs¹, J.J. Norman¹, P. Wei², Z. Ding², B. Ziaie², D. Bernstein¹, E. Kuhl¹, and B.L. Pruitt¹
¹Stanford University, USA and ²Purdue University, USA
- F2P.17 THE BIOACTIVITY OF RECOMBINANT TAGGED-EGF DESIGNED FOR TISSUE ENGINEERING APPLICATIONS IS MODULATED BY THE NATURE AND POSITION OF THE TAGS
C. Boucher^{1,2}, G. St-Laurent¹, M. Loignon¹, M. Jolicoeur², G. De Crescenzo², and Y. Durocher¹
¹National Research Council, CANADA and ²École Polytechnique de Montréal, CANADA
- F2P.18 TOWARDS FUNCTIONAL LIPID BILAYER ARRAYS
J. Vogel^{1,2}, J.S. Hansen^{1,2}, M. Perry¹, C.H. Nielsen^{1,3}, and O. Geschke²
¹Aquaporin A/S, DENMARK and ²Technical University of Denmark, DENMARK

11:00 **Poster Session 5**

12:00 **Award Ceremony**

12:20 **Conference Adjourns**