



Microneedles 2012

Cork, Ireland | 13th-15th May



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Technical Programme



Agilent Technologies

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Conference organisation

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Dr. Kris Hansen, 3M Drug Delivery Systems, USA.

Prof. Mark Kendall, University of Queensland, Australia.

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Dr. Ron J. Pettis, BD Technologies, USA.

Prof. Mark Prausnitz, Georgia Institute of Technology, USA.

Prof. Niclas Roxhed, KTH Royal Institute of Technology, Sweden.

Dr. Conor O'Mahony, Tyndall National Institute, Ireland.

Conference Programme Summary

Sunday 13th May

- 12:00** Registration & Poster Hanging
- 13:00** Short Course: Microneedle Technology
- 18:00** Informal Welcome Reception - Clarion Hotel

Monday 14th May

- 08:30** Opening Address & Welcome (Guest: Minister Sean Sherlock)
- 09:15** **Session 1** - Design & Technology I: Solid and Hollow Microneedles
- 11.15** **Session 2** - Design & Technology II: Polymer & Biodegradable Microneedles
- 14:00** **Session 3**: Coatings & Formulation
- 15:20** **Session 4** - Flash Presentations
- 16:20** **Session 5** - Poster Viewing & Coffee
- 17.45** Close
- 18:00** Bus Transfer to Old Middleton Distillery

Tuesday 15th May

- 09:00** **Session 6**: Vaccine Delivery (1)
- 11:05** **Session 7**: Vaccine Delivery (2)
- 14:00** **Session 8**: Drug Delivery
- 15:35** **Session 9**: Clinical Translation
- 17:00** Closing Remarks & Conference Close

Technical Programme

Keynote and Invited Speakers

Keynote Presentations

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3	Skin is special: exploiting it with practical microneedle devices for improved vaccines, and diagnosis of disease Prof. Mark Kendall <i>University of Queensland, Australia</i>	3
6	Transcutaneous vaccination by means of microneedles and polymeric nanoparticles Prof. Dr. Joke Bouwstra <i>Leiden/Amsterdam Center for Drug Research, The Netherlands</i>	4
9	Advancing Microneedle Patch Technology to Commercialization Dr. Peter Daddona <i>Zosano Pharma, USA</i>	6

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2	Biodegradable polymer microneedle separation in skin mediated by hydrogel swelling Prof. Jung-Hwan Park <i>Gachon University, Korea</i>	8
3	Microneedles for Lymphatic Targeting: New Applications for a New Route Dr. Ronald J. Pettis <i>BD Technologies, USA</i>	9
6	A Novel Microneedle Device for ID Delivery of Vaccines: Clinical Experience and Commercial Opportunities Dr. Yotam Levin <i>NanoPass Technologies, Israel</i>	11
7	DNA delivery to skin is enhanced by next generation electroporation devices that target dermal tissue Dr. Kate Broderick <i>Inovio Pharmaceuticals, USA</i>	13
8	Moving to active microneedle mediated drug delivery... the Janisys technology Dr. John O'Dea <i>Crospon, Ireland</i>	14
9	Microneedle Delivery: Translating Laboratory Effectiveness To Patient Usage Dr. James Birchall <i>Cardiff University, Wales</i>	15

Short Course Programme – Sunday 13th May

13:00 Welcome and Introduction

Dr. James Birchall
Cardiff University, Wales

13:15 Microneedle history, motivation and design

Prof. Mark Prausnitz
Georgia Institute of Technology

14:00 Microneedle Fabrication

Prof. Jung-Hwan Park
Gachon University, Korea

14.45 *Coffee Break*

15:15 Microneedle testing and characterization

Dr. Sion Coulman
Cardiff University, Wales

16:00 Microneedle applications

Dr. Anne Moore
University College Cork, Ireland

16:45 Microneedle Human Studies and Commercialization

Dr. Kris Hansen
3M Drug Delivery Systems, USA

17:30 *Close*

Informal Welcome Reception

Technical Programme – Monday 14th May

Session 1: Design & Technology I - Solid and Hollow Microneedles

08.30	Opening Address & Welcome	
09.15	<u>Keynote:</u> Evaluation of microneedles in human subjects M. R. Prausnitz <i>¹Georgia Institute of Technology</i>	1
09.45	Methods to Design and Manufacture Solid and Hollow Microneedles at Scale L. Hayward ¹ , R. Pricone ² and J. Nelson ² <i>¹VentureLab Inc., USA</i> <i>²10x Technology LLC, USA</i>	16
10.00	Manufacturable, Microneedle-based Dry Electrodes For Biosensing Applications C. O'Mahony ¹ , F. Pini ^{1, 2} , A. Blake ¹ , C. Webster ¹ , J. O'Brien ¹ and K. G. McCarthy ² <i>¹Tyndall National Institute, Ireland</i> <i>²University College Cork, Ireland</i>	17
10.15	Measuring penetration forces of microneedles H. Liebl <i>Dermaroller, Germany</i>	18
10.30	Silicon microneedles for drug delivery and blood sampling applications P.F. Eng ¹ , O.J. Guy ¹ , Y. Liu ¹ , P.R. Williams ¹ , K. Roberts ² , J. Patel ² and H. Ashraf ² <i>¹Swansea University, UK</i> <i>²SPTS Technologies Limited, UK</i>	19
10.45	Coffee Break	

Session 2: Design & Technology II - Polymer & Biodegradable Microneedles

11.15	<u>Invited:</u> Microneedle-based Drug Delivery - How Less can be More Dr. Kris Hansen <i>3M Drug Delivery Systems, USA</i>	7
11.35	<u>Invited:</u> Biodegradable polymer microneedle separation in skin mediated by hydrogel swelling Prof. Jung-Hwan Park <i>Gachon University, Korea</i>	8

11.55	Low temperature micro drawing for fabrication of biodegradable microneedles for vascular diseases	20
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	J. Kochhar, S. Yung Chan and L. Kang <i>National University of Singapore, Singapore</i>	
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	C. Barrett, K. Dawson, C. O'Mahony and A. O'Riordan <i>Tyndall National Institute, Ireland</i>	
12.40	Lunch	

Session 3: Coatings & Formulation

14:00	<u>Keynote:</u> Skin is special: exploiting it with practical microneedle devices for improved vaccines, and diagnosis of disease	2
	Prof. Mark Kendall <i>University of Queensland, Australia</i>	
14:30	<u>Invited:</u> Microneedles for Lymphatic Targeting: New Applications for a New Route	9
	Dr. Ronald J. Pettis <i>BD Technologies, USA</i>	
14:50	Stabilization of measles vaccine coated on microneedles	23
	C. Edens ¹ , M. L. Collins ² , P. A. Rota ² and M. R. Prausnitz ¹ ¹ <i>Georgia Institute of Technology, USA</i> ² <i>Centers for Disease Control and Prevention, USA</i>	
15:05	Erythropoietin Coated ZP-Microneedle System: Preclinical Formulation and Delivery	24
	E. E. Peters, M. Ameri, X. Wang, Y.-F. Maa and P. E. Daddona <i>Zosano Pharma Inc., USA</i>	

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	¹ Tokushima Bunri University, Japan	
	² MEDRx Co., Ltd., Japan	
	³ Teijin Limited, Japan	
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	¹ University College Dublin, Ireland	
	² Université de Lyon, France	
	³ National University of Ireland Galway, Ireland	
	⁴ Univ Paris 6, France	
	⁵ Università degli Studi di Perugia, Italy	
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	¹ Tyndall National Institute, Ireland	
	² Dublin City University, Ireland	
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	¹ Yonsei University, Korea	
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	¹ Centers for Disease Control and Prevention, USA	
	² Georgia Institute of Technology, USA	
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	S. Vucen ^{1,3} , G. Vuleta ² , A. Crean ³ , A. Moore ³ , N. Ignjatovic ⁴ and D. Uskokovic ⁴	
	¹ University of Banja Luka, Bosnia and Herzegovina	
	² University of Belgrade, Serbia	
	³ University College Cork, Ireland	
	⁴ Institute of technical sciences of the Serbian Academy of Sciences and Arts, Serbia	
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	J. de Groot ¹ , M. Verhoeven ² , D. Fernandez Rivas ² , T.D. de Gruijl ¹ , R.J. Schepers ³ and R. Luttge ^{2,3}	
	¹ Free University Medical Center (VUmc), The Netherlands	
	² Mesoscale MESA+ Institute for Nanotechnology, The Netherlands.	
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	The University of British Columbia, Canada	
17.45	Close; Bus Transfer to Conference Dinner at 18.00.	

Technical Programme – Tuesday 15th May

Session 6: Vaccine Delivery (1)

09:00	<u>Keynote:</u> Transcutaneous vaccination by means of microneedles and polymeric nanoparticles	4
	Prof. Dr. Joke Bouwstra <i>Leiden/Amsterdam Center for Drug Research, The Netherlands</i>	
09:30	<u>Invited:</u> A Novel Microneedle Device for ID Delivery of Vaccines: Clinical Experience and Commercial Opportunities	11
	Dr. Yotam Levin <i>NanoPass Technologies, Israel</i>	
09:50	Immupatch Vaccination	69
	A. Moore ¹ , A. Vrdoljak ¹ , M. McGrath ¹ , S. Draper ² , A. Hill ² , A. Crean ¹ and C. O'Mahony ³ ¹ University College Cork, Ireland ² The Jenner Institute, UK ³ Tyndall National Institute, Ireland.	
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	S. Kommareddy ¹ , A. Bonificio ¹ , S. Gallorini ¹ , G. Palladino ¹ , A. Determan ² , D. Dohmeier ¹ , K. Hansen ² , M. Singh ¹ , P.R. Dormitzer ¹ , B.C. Baudner ¹ and D.T. O'Hagan ¹ ¹ Novartis Vaccines and Diagnostics Research Center, USA and Italy ² 3M Drug Delivery Systems, 3M St. Paul, MN 55001	
10.20	Polymer multi-layer tattooing for enhanced DNA vaccines	71
	P. C. DeMuth ¹ , B. Huang ¹ , Y. Min ¹ , P. T. Hammond ^{1,2} and D. J. Irvine ^{1, 2, 3, 4} ¹ Massachusetts Inst. of Technology, USA ² Institute for Soldier Nanotechnology, USA ³ Ragon Inst. of MGH, MIT, and Harvard, USA ⁴ Howard Hughes Medical Inst., USA	
10.35	Coffee Break	

Session 7: Vaccine Delivery (2)

11.05	<u>Invited:</u> DNA delivery to skin is enhanced by next generation electroporation devices that target dermal tissue	13
	Dr. Kate Broderick <i>Inovio Pharmaceuticals, USA</i>	
11.25	Comparison of Microneedle and Systemic Routes of Immunization with Influenza A H1N1 Vaccine in the Guinea Pig Model	72
	E. V. Vassilieva ¹ , V. G. Zarnitsyn ² , E. S. Esser ¹ , M. T. Taherbhai ¹ , D. G. Koutsonanos, M. R. Prausnitz ² , R. W. Compans ¹ and I. Skountzou ¹ ¹ Emory University School of Medicine, USA ² Georgia Institute of Technology, USA	

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	D. G. Koutsonanos ¹ , V. G. Zarnitsyn ² , E. S. Esser ¹ , M. T. Taherbhai ¹ , A. Stavropoulou ³ , E. V. Vassilieva ¹ , M. R. Prausnitz ² , R. W. Compans ¹ and I. Skountzou ¹	
	¹ Emory University School of Medicine, USA	
	² Georgia Institute of Technology, USA	
	³ University of Athens, Greece	
11.55	DNA vaccination against influenza using a coated microneedle patch	74
	Y.-C. Kim ¹ , J.-M. Song ² , R. Compans ³ , S.-Moo Kang ² and M. Prausnitz ⁴	
	¹ Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea	
	² Georgia State University, Atlanta, USA	
	³ Emory University School of Medicine, USA	
	⁴ Georgia Institute of Technology, USA	
12.10	Translation of a Dissolving Microneedle Patch for Influenza Vaccination Into the Clinic	75
	H. Kalluri ¹ , D. McAllister ¹ , M. Scoggins ¹ , W. Pewin ¹ , S. Henry ¹ , M. Prausnitz ¹ , Emory University ² and PATH ³	
	¹ Georgia Institute of Technology, USA	
	² Emory University School of Medicine, USA	
	³ PATH, USA	
12.25	Lunch	

Session 8: Drug Delivery

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	Dr. John O'Dea <i>Crospon, Ireland</i>	
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	Y. C. Kim ¹ , H. F. Edelhauser ² and M. R. Prausnitz ¹	
	¹ Georgia Institute of Technology, USA	
	² Emory University Eye Center, USA	
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	J. J. Norman ¹ , N. A. Raviele ² , M. R. Brown ² , M. R. Prausnitz ¹ and E. I. Felner ^{1,2}	
	¹ Georgia Institute of Technology, USA.	
	² Emory University School of Medicine, Atlanta, GA, USA.	
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	¹ HSG-IMIT, Germany	
	² HSG-IMAT, Germany	
	³ University Medical Centre Mannheim, Germany	
15:05	Coffee Break	

Session 9: Clinical Translation

15:35	<u>Keynote:</u> Advancing Microneedle Patch Technology to Commercialization	6
	Dr. Peter Daddona <i>Zosano Pharma, USA</i>	
16:05	<u>Invited:</u> Microneedle Delivery: Translating Laboratory Effectiveness To Patient Usage	15
	Dr. James Birchall <i>Cardiff University, Wales</i>	
16:25	Understanding Patient Administration of a Microneedle Patch	79
	F. Arikat ¹ , D.N. John ¹ , A. Anstey ² , J.C. Birchall ¹ and S.A. Coulman ¹ ¹ Cardiff University, UK ² Aneurin Bevan Health Board Royal Gwent Hospital, UK.	
16:40	Microneedle-Mediated Monitoring - An acceptable alternative for children?	80
	K. Mooney, R. Donnelly and J. McElnay <i>Queen's University Belfast, Northern Ireland</i>	
16:55	<i>Closing Remarks</i>	
17.10	<i>Close</i>	