

Gianluca Grenci, PhD

Head of micro/nano Fabrication Research Facility @ MBI-NUS NUS Senior Research Scientist

Short Profile

- 5 Years of experience as head of micro/nano fabrication research facility at MBI-NUS (team of 6 people).
- 60 research papers published, 2 patents and 165 h of teaching in the field of applied nano-technology.
- Problem oriented design, fabrication and commercialization of micro-devices for biological applications
- Expert in micro-optics for biology
- Expert in micro-fabrication for Infra-red spectro-microscopy and its application to biology
- 6 years' experience in Synchrotron light related spectroscopic techniques (SAXS, FTIR) and in design and fabrication of X-ray optics.

Job Experience

August 2012 – Present Position: **Head of Micro/Nano fabrication facility** and Senior Research Scientist at the Mechanobiology Institute (dir. prof. M. Sheetz, National University of Singapore, Singapore).

I lead a staff of 6 RA and manage the micro/nano fabrication facility as to provide support for the research activities of MBI; the facility consists of a clean room fully equipped for UV lithography and other processes (e.g. thin film coating, reactive ion etching, etc.). As NUS senior research scientist, I develop a research program aimed at developing micro/nano structured tools for live cell observation (e.g. microscopy and spectroscopy)

May 2009 – August 2012: **Scientist at CNR-IOM, TASC National Laboratory**

Fabrication of scaffolds for controlled growth of neurons and neuronal networks using EB and X-ray lithography, development of optical micro-systems and microfluidic devices

November 2006 – May 2009

Post-doc grant at CNR-INFN, TASC laboratory

Design, optimization and fabrication of micro-fluidic devices

May 2006 - November 2006:

Consultant for the Austrian Academy of Science

Design, optimization and fabrication of micro-fluidic devices for SAXS measurements

January 2002 – December 2004:

PhD student, Polytechnic school of Torino (IT) and INRIM “Galileo Ferraris” (Torino, IT)

Development of an electromagnetic shield made by high T_c superconductors for metrological applications

January 2000 - January 2001:

Stage at Edison Termoelettrica S.p.A.

Design and installation of a system for characterizing the AC losses of superconductive strips at liquid nitrogen temperature

Nano-fabrication skills

- More than 10 years of activity in clean room up to class 10 (ISO 4)
- Electron Beam, UV and X-ray Lithography, Nano-imprinting lithography, LIGA
- Electrodeposition, Thin film coating (sputtering and thermal/e-gun evaporation)
- Dry etching (Reactive Ion Etching and ICP), Wet anisotropic etching
- Soft lithography and micro-fluidic
- Mask design (L-edit and Layout editor) and fabrication

Teaching Experiences

Total of 165 h of frontal teaching, 3 teaching modules developed

- 2015/2016 and 2016/2017, NUS (Singapore), **Microfabrication for Biologists**, 18h
MB5105 for graduate students:
- 2011/2012, University of Trieste (Italy), **Nanotechnologies and Nano-microscopies 2**,
master degree in Medical Biotechnologies 28.5 h
- 2011, Area di Ricerca (Trieste, IT) and ICGEB (Trieste, IT) **Elements of micro-fluidic**, 32 h
- 2010/2011, University of Trieste (Italy), **Nanotechnologies and Nano-microscopies 2**,
master degree in Medical Biotechnologies 28.5 h
- 2004/2005, Polytechnics School of Turin (Italy), master degree on Aero-spatial
Engineering **Statistics**, 20 h of Laboratory classes
- 2003/2004, Polytechnics School of Turin (Italy), master degree on Aero-spatial
Engineering **Statistics**, 20 h of Laboratory classes

Education

- May 2005: **PhD on Metrology: Science and Technology of Measurements**
Polytechnic school of Torino (IT), DISPEA - Dipartimento di Sistemi di Produzione ed
Economia dell'Azienda – in collaboration with INRIM – “G.Ferraris”
*Title: “Development of Electromagnetic Shields made with High T_c superconductors for metrological
applications”*
PhD Scholarship 2001-2004 from Turin Polytechnic School
- December 2000: **Master Degrees on Materials Engineering**
Polytechnic school of Torino (IT), Dipartimento di Chimica e Scienza dei Materiali, mark
105/110
Title: “Characterization of High T_c Superconductors strips in AC regime”

Language Proficiency

- English: Fluent in spoken and written
French: Good in spoken and written
Italian: Mother tongue

Publications

Publications as corresponding author or as leading author for micro/nano fabrication:

1. Singh, A.P., Galland, R., Finch-Edmondson, M.L., **Grenci, G.**, Sibarita, J.-B., Studer, V., Viasnoff, V., Saunders, T.E., *Biophysical Journal*, 2017, 112 (1), pp. 133-142.
2. I. Stassen, M. Styles, **G. Grenci**, H. Van Gorp, W. Vanderlinden, S. De Feyter, P. Falcaro, D. De Vos, P. Vereecken and R. Ameloot, *Nature Materials*, 2016, 15, 304-310.
3. B. L. Khoo, **G. Grenci**, T. Jing, Y. B. Lim, S. C. Lee, J. P. Thiery, J. Han and C. T. Lim, *Science Advances*, 2016, 2.
4. F. Cerrina and **G. Grenci**, in *Reference Module in Materials Science and Materials Engineering*, Elsevier, 2016, DOI: <http://dx.doi.org/10.1016/B978-0-12-803581-8.03732-2>.
5. G. Birarda, A. Ravasio, M. Suryana, S. Maniam, H. Y. N. Holman and **G. Grenci**, *Lab on a Chip - Miniaturisation for Chemistry and Biology*, 2016, 16, 1644-1651.
6. **G. Grenci**, E. Zanchetta, A. Pozzato, G. Della Giustina, G. Brusatin and M. Tormen, *Applied Materials Today*, 2015, 1, 13-19.
7. R. Galland, **G. Grenci**, A. Aravind, V. Viasnoff, V. Studer and J. B. Sibarita, *Nature Methods*, 2015, 12, 641-644.
8. E. Mitri, G. Birarda, L. Vaccari, S. Kenig, M. Tormen and **G. Grenci**, *Lab on a Chip - Miniaturisation for Chemistry and Biology*, 2014, 14, 210-218.
9. W. Jark and **G. Grenci**, *Proceedings of SPIE - The International Society for Optical Engineering*, Volume 9207, 2014.
10. W. Jark and **G. Grenci**, *Optics Letters*, 2014, 39, 1250-1253.
11. L. Ianeselli, **G. Grenci**, C. Callegari, M. Tormen and L. Casalis, *Biosensors and Bioelectronics*, 2014, 55, 1-6.
12. **G. Grenci**, E. Sovernigo, A. Z. Khokhar, N. Gadegaard, M. Prasciolu and M. Tormen, *Sensors and Actuators, A: Physical*, 2014, 205, 111-118.
13. G. Birarda, D. E. Bedolla, E. Mitri, S. Pacor, **G. Grenci** and L. Vaccari, *Analyst*, 2014, 139, 3097-3106.
14. E. Zanchetta, G. D. Giustina, **G. Grenci**, A. Pozzato, M. Tormen and G. Brusatin, *Advanced Materials*, 2013, 25, 6261-6265.
15. E. Mitri, A. Pozzato, G. Coceano, D. Cojoc, L. Vaccari, M. Tormen and **G. Grenci**, *Microelectronic Engineering*, 2013, 107, 6-9.
16. C. M. Doherty, **G. Grenci**, R. Riccò, J. I. Mardel, J. Reboul, S. Furukawa, S. Kitagawa, A. J. Hill and P. Falcaro, *Advanced Materials*, 2013, 25, 4701-4705.
17. L. Vaccari, G. Birarda, L. Businaro, S. Pacor and **G. Grenci**, *Analytical Chemistry*, 2012, 84, 4768-4775.
18. **G. Grenci**, G. Della Giustina, A. Pozzato, E. Zanchetta, M. Tormen and G. Brusatin, *Microelectronic Engineering*, 2012, 98, 134-137.
19. **G. Grenci**, G. Birarda, E. Mitri, L. Businaro, S. Pacor, L. Vaccari and M. Tormen, *Microelectronic Engineering*, 2012, 98, 698-702.
20. E. Migliorini, **G. Grenci**, J. Ban, A. Pozzato, M. Tormen, M. Lazzarino, V. Torre and M. E. Ruaro, *Biotechnology and Bioengineering*, 2011, 108, 2736-2746.
21. **G. Grenci**, A. Pozzato, A. Carpentiero, E. Sovernigo and M. Tormen, *Microelectronic Engineering*, 2011, 88, 2552-2555.
22. **G. Grenci**, G. Della Giustina, A. Pozzato, G. Brusatin and M. Tormen, *Microelectronic Engineering*, 2011, 88, 1964-1967.
23. L. Brigo, **G. Grenci**, A. Carpentiero, A. Pistore, M. Tormen, M. Guglielmi and G. Brusatin, *Journal of Sol-Gel Science and Technology*, 2011, 60, 400-407.
24. L. Brigo, **G. Grenci**, L. Ba, A. Carpentiero, F. Mancin, F. Romanato, M. Tormen, M. Guglielmi and G. Brusatin, *Microelectronic Engineering*, 2011, 88, 1913-1916.

25. L. Brigo, A. Pistore, **G. Greci**, A. Carpentiero, F. Romanato and G. Brusatin, *Microelectronic Engineering*, 2010, 87, 947-950.
26. G. Birarda, **G. Greci**, L. Businaro, B. Marmiroli, S. Pacor and L. Vaccari, *Microelectronic Engineering*, 2010, 87, 806-809.
27. G. Birarda, **G. Greci**, L. Businaro, B. Marmiroli, S. Pacor, F. Piccirilli and L. Vaccari, *Vibrational Spectroscopy*, 2010, 53, 6-11.
28. B. Marmiroli, **G. Greci**, F. Cacho-Nerin, B. Sartori, E. Ferrari, P. Laggner, L. Businaro and H. Amenitsch, *Lab on a Chip - Miniaturisation for Chemistry and Biology*, 2009, 9, 2063-2069.
29. **G. Greci**, S. Denis, L. Dusoulier, F. Pavese and N. Penazzi, *Superconductor Science and Technology*, 2006, 19, 249-255.

Collaborative publications:

1. E. Mitri, S. Kenig, G. Coceano, D. E. Bedolla, M. Tormen, **G. Greci** and L. Vaccari, *Analytical Chemistry*, 2015, 87, 3670-3677.
2. G. Mistura, A. Pozzato, **G. Greci**, L. Bruschi and M. Tormen, *Nature Communications*, 2013, 4.
3. E. Migliorini, J. Ban, **G. Greci**, L. Andolfi, A. Pozzato, M. Tormen, V. Torre and M. Lazzarino, *Biotechnology and Bioengineering*, 2013, 110, 2301-2310.
4. T. L. Lien, J. Ban, M. Tormen, E. Migliorini, **G. Greci**, A. Pozzato and V. Torre, *PLoS ONE*, 2013, 8.
5. L. Gregoratti, A. Goldoni, O. Trygub, M. Marazzi, M. Tormen, **G. Greci**, S. Dalzilio, R. Vidoni and A. Gasparetto, European Space Agency, (Special Publication) ESA, Volume 705 SP, 2013.
6. S. Dal Zilio, A. Pozzato, **G. Greci**, E. Sovernigo and M. Tormen, *Microelectronic Engineering*, 2013, 110, 335-339.
7. D. E. Bedolla, S. Kenig, E. Mitri, P. Ferraris, A. Marcello, G. Greci and L. Vaccari, *Analyst*, 2013, 138, 4015-4021.
8. L. Vaccari, G. Birarda, **G. Greci**, S. Pacor and L. Businaro, *Journal of Physics: Conference Series*, 2012, 359.
9. T. Haatainen, T. Mäkelä, A. Schleunitz, **G. Greci** and M. Tormen, *Microelectronic Engineering*, 2012, 98, 180-183.
10. C. Dimitrakakis, B. Marmiroli, H. Amenitsch, L. Malfatti, P. Innocenzi, **G. Greci**, L. Vaccari, A. J. Hill, B. P. Ladewig, M. R. Hill and P. Falcaro, *Chemical Communications*, 2012, 48, 7483-7485.
11. L. Businaro, O. Limaj, V. Giliberti, M. Ortolani, A. Di Gaspare, **G. Greci**, G. Ciasca, A. Gerardino, A. De Ninno and S. Lupi, *Microelectronic Engineering*, 2012, 97, 197-200.
12. I. Shyjumon, M. Rappolt, B. Sartori, F. Cacho-Nerin, **G. Greci**, P. Laggner and H. Amenitsch, *Langmuir*, 2011, 27, 5542-5548.
13. A. Pozzato, **G. Greci**, G. Birarda and M. Tormen, *Microelectronic Engineering*, 2011, 88, 2096-2099.
14. M. Faustini, B. Marmiroli, L. Malfatti, B. Louis, N. Krins, P. Falcaro, **G. Greci**, C. Laberty-Robert, H. Amenitsch, P. Innocenzi and D. Grosso, *Journal of Materials Chemistry*, 2011, 21, 3597-3603.
15. P. Falcaro, S. Costacurta, L. Malfatti, D. Buso, A. Patelli, P. Schiavuta, M. Piccinini, **G. Greci**, B. Marmiroli, H. Amenitsch and P. Innocenzi, *ACS Applied Materials and Interfaces*, 2011, 3, 245-251.
16. G. Birarda, **G. Greci**, L. Businaro, E. Mitri, M. Tormen, S. Pacor and L. Vaccari, Proceedings of the Micro TAS conference (2011), Seattle (Washington, USA).

17. B. Marmiroli, **G. Greci**, F. Cacho-Nerin, B. Sartori, P. Laggner, L. Businaro and H. Amenitsch, *Nuclear Instruments and Methods in Physics Research, Section B: Beam Interactions with Materials and Atoms*, 2010, 268, 329-333.
18. L. Malfatti, D. Marongiu, S. Costacurta, P. Falcaro, H. Amenitsch, B. Marmiroli, **G. Greci**, M. F. Casula and P. Innocenzi, *Chemistry of Materials*, 2010, 22, 2132-2137.
19. S. Costacurta, L. Malfatti, A. Patelli, P. Falcaro, H. Amenitsch, B. Marmiroli, **G. Greci**, M. Piccinini and P. Innocenzi, *Plasma Processes and Polymers*, 2010, 7, 459-465.
20. G. J. Bakeine, L. Benedetti, D. Galli, **G. Greci**, A. Pozzato, M. Prasciolu, M. Tormen and G. Cusella, *Microelectronic Engineering*, 2010, 87, 830-833.
21. A. Rossi, G. Vallone, F. De Martini, P. Mataloni, L. Businaro, **G. Greci** and M. Tormen, *Journal of Modern Optics*, 2009, 56, 190-195.
22. M. Matteucci, M. Fanetti, M. Casella, F. Gramatica, L. Gavioli, M. Tormen, **G. Greci**, F. De Angelis and E. Di Fabrizio, *Microelectronic Engineering*, 2009, 86, 752-756.
23. P. Falcaro, L. Malfatti, L. Vaccari, H. Amenitsch, B. Marmiroli, **G. Greci** and P. Innocenzi, *Advanced Materials*, 2009, 21, 4932-4936.
24. P. Falcaro, L. Malfatti, T. Kidchob, G. Giannini, A. Falqui, M. F. Casula, H. Amenitsch, B. Marmiroli, **G. Greci** and P. Innocenzi, *Chemistry of Materials*, 2009, 21, 2055-2061.
25. G. Birarda, **G. Greci**, L. Businaro, B. Marmiroli, G. Bellisola and L. Vaccari, 2009.
26. G. J. Bakeine, A. Bertolotti, C. Zennaro, **G. Greci**, A. Pozzato, S. D. Zilio, M. Prasciolu, M. Carraro, L. Businaro, M. Tormen, M. Alessiani, R. Nano and P. Dionigi, *Microelectronic Engineering*, 2009, 86, 1468-1472.
27. G. J. Bakeine, J. Ban, **G. Greci**, A. Pozzato, S. D. Zilio, M. Prasciolu, L. Businaro, M. Tormen and M. E. Ruaro, *Microelectronic Engineering*, 2009, 86, 1435-1438.
28. S. Denis, **G. Greci**, L. Dusoulier, R. Cloots, P. Vanderbemden, B. Vanderheyden, M. Dirickx and M. Ausloos, *Journal of Physics: Conference Series*, 2006, 43, 509-512.
29. V. Dellarocca, R. S. Gonnelli, S. Bodoardo, N. Penazzi, **G. Greci**, C. Portesi, M. Rajteri, A. Morawski and T. ŁAda, *Physica Status Solidi C: Conferences*, 2005, 2, 1662-1667.

Chapter in book:

- *X-ray lithography: fundamentals and applications*; Massimo Tormen, **Gianluca Greci**, Benedetta Marmiroli and Filippo Romanato; in "Nano Lithography" edited by S.Landis, Vol. 2, John Wiley & Sons, Inc., Hoboken USA
- *Synchrotron Radiation Infrared Microspectroscopy (SR-IRMS) of living-cells in physiological environment*; Giovanni Birarda, **Gianluca Greci** and Lisa Vaccari; in *Microscopy: Science, Technology, Applications and Education*, Mendez-Vilas and Jesus Diaz Alvarez editors, Formatex Research Center, ISBN 978-84-614-6189-9, vol 1, pag. 422-432

Patents:

- Metal Organic Frameworks - Non-convention Patent Application – Provisional - 35113998/RDT
- Imaging - UK Patent Application Serial No. 1315248.3 filed on 28 August 2013

Conferences and workshops

- ISMI-SSLS workshop, 23rd February 2017, invited talk
 - SAXS20years, Trieste (Italy), 10-12 October 2016, invited talk
 - MNE 2016, Vienna (Austria), 19-23 September, 2 poster presentations
 - Micro TAS 2015, Gyeongju (Korea), 25-29 October 2015 (poster presentation)
 - MNE 2015, The Hague (Netherlands), 21-25 September 2015 (one poster and one oral presentations)
 - Advances in X-Ray/EUV Optics and Components IX, 18 - 20 August 2014 S.Diego (California, USA)
 - HARMNST 2013, 21 – 24 April, Berlin (DE) (2 oral presentations)
 - MNE 2013 – 39th International Micro & Nano Engineering Conference London (UK), 16 to 19 September 2013 (1 poster presentation)
 - MNE 2012 – 38th International Micro & Nano Engineering Conference Toulouse (France), 16 to 20 September 2012 (3 posters and 2 oral presentations)
 - MNE 2011 - 37th International Conference on Micro and Nano Engineering 19 - 23 September 2011 (4 posters presentations)
 - EIPBN 2011 – 55th International conference on Electron, Ion and Photon Beam Technology and Nanofabrication, June 2011, Las Vegas (USA), (oral presentation)
 - Hybrid Materials 2011 –International Conference on Multifunctional, Hybrid and Nanomaterials, Strasbourg, France, 6-10/03/2011 (1 oral + 1 poster presentation)
 - ICAVS-6, Sixth International Conference on Advanced Vibrational Spectroscopy, June 2011 Sonoma County, California (USA) (poster)
 - MNE10 - 36th International conference on Micro and Nano Engineering - Oct 2010 Genova – Italy (2 oral + 1 poster presentations)
 - μ -TAS, The 14th International Conference on Miniaturized Systems for Chemistry and Life Sciences, October 2010 Groningen (Holland) (poster presentation)
 - SPEC 2010, June
 - MNE09 - 35th International conference on Micro and Nano Engineering - Sept 2009 Ghent – Belgium (1 oral presentation + 2 poster presentations)
 - E-MRS, June 2009 Strasbourg (France) (oral presentation)
 - MRS 2009, April 2009 San Francisco (California, USA) (oral presentation)
 - NNT 2009, November 2009 San José (California, USA) (poster presentation)
 - MNE 2008 - 34th International conference on Micro and Nano Engineering - Sept 2008 Athens - Greece (3 poster presentations)
 - HARMST 2007, 7th international workshop on High-Aspect-Ratio-Micro-Structure-Technology, May 2007 Besançon (France) (poster presentation)
 - EUCAS 2005, 7th European Conference on Applied Superconductivity, September 2005 Vienna (Austria) (poster presentation)
 - EUCAS 2003, 6th European Conference on Applied Superconductivity, September 2003, Sorrento (Italy) (poster presentation)
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