

GIROLAMO MINCUZZI**Personal Information:****Name:** Girolamo**Surname:** Mincuzzi**a) Education and training:**

1 – April 14th 2011 **PhD in Micro Electronic Engineering, University of Rome “Tor Vergata” (Italy) Centre for Hybrid and Organic Solar Energy (C.H.O.S.E.) – Electronic Department.**

Thesis title: **”Dye Solar Cell Manufacturing via Laser Assisted Fabrication Processes”.**

Research activity:

- **laser processing of materials for energy and innovative laser fabrication processes** for Dye Sensitized Solar Cells Manufacturing (nc-TiO₂ laser sintering and patterning, Pt precursor laser curing, device laser sealing, metal foils laser cutting, scribing, TCO graphene and nanotube precursor patterning).
- **processes characterization and analysis** by Electro Impedance Spectroscopy Techniques (EIS), Incident Photon to Charge Efficiency Analysis (IPCE), Thermography, Tafel Analysis, Optical Confocal and Electronic Microscopy.
- **set-up and optimization of a multi-wavelengths laser processing laboratory.** Optimization of non-linear conversion processes (SHG, THG), Boyd Focusing Condition, set up of optical apparatus on optical bench, beams alignment, use of laser beam profiler, optical power measurement, M² measurement.

2 –July 21st 2005 **Physics Graduate, University of Bari (Italy) course of studies in quantum electronic with final marks 104/110.**

Thesis title: **”L.I.D.A.R. Monitoring of low troposphere: study case of Naples and Pontecagnano”.**

The thesis was carried out at the **Atomic Physics and Laser Application Laboratory - University Federico II, Naples (Italy).**

Thesis work:

- **optimization of two Lidar systems** (one transportable for field measurements).
- Diurnal cycle monitoring campaign of low troposphere dynamic
- Optimization of Ansmann algorithm for retrieval of atmosphere optical parameters

3 – 1991 **High School “A.Scacchi” (Bari) - Scientific High school degree, final marks 60/60**

b) International PhD Schools and Workshop

- 1 - September 2008 **2nd International School on Organic Photovoltaics (ISOPHOS 2008)**, Ventotene-Italy
- 2 - September 2009 **International School of Nanophotonics and Photovoltaics 2009** , Maratea-Italy
- 3 - October 2009 **“WHOSE 2009-Workshop on Hybrid and Organic Solar Energy”**, Monte Porzio
Catone-Italy
- 4 - July 2011 International Workshop **“Advances in Photovoltaic and Photocatalysis”** – Munich
Germany

c) Research activities and jobs

- 1 - Since November 2011 **University of Rome Tor Vergata, Post-doc Researcher.**
- “SINEAD” project (granted by the E.U. funding scheme ERA-NET+) focused on
“**Sintering via laser of nc-TiO₂ films for photovoltaic application over flexible substrates**”
 - **Tenure track** of the “Flexible Devices and Laser Processing” group
- 2 - August 2011/ **External Consultant** of the industrial consortium **“Dyepower”**. The activity has been
September 2011 focused on “**Laser assisted development of contacts embedded for Modules Dye Sensitized**”.
- 3 - January 2008 / **University of Rome Tor Vergata**, Fellow at the Centre for Hybrid and Organic Solar
May 2011 Energy (C.H.O.S.E.). The activity has been focused on laser processing of material for
energy and development of laser assisted fabrication process for Dye Sensitized Solar
Cells (DSCs)
- 4 – April 2007 / **LASIT LightMarking - an El.En Group Company** - Vico Equense (Naples - Italy) :
November 2007 employee as **laser designer** for development of high and medium power lasers utilised
in marking process. Activities: **optical cavities alignment, design of pumping system,**
thermal lensing evaluation, design of Diode End Pumped linear cavities
- 5 – May 2006 / **National Institute for Applied Optic (I.N.O.-C.N.R.) - Pozzuoli (Naples - Italy)**. Fellow
March 2007 in the frame of the project “**LACER – ceramic laser development**”.

- investigation of ceramic solid state materials optical properties
- investigation of possible pumping geometries
- characterization of thermo mechanical effects and thermal lensing
- Mach-Zehnder interferometry study of aberrations induced by high pump energy.

d) Further activities

- 1 - September 2005
/ December 2005 **Volunteer at University of Naples Federico II - Atomic Physics and laser application laboratory.** The activity was focused on data acquisition and analysis for the L.I.D.A.R. monitoring campaigns "Launch" and "Aequate"
- 2 - January
/ April 2007 **National Institute for Nuclear Physics (I.N.F.N) - Naples (Italy).** Fellow in the frame of project "D.U.A.L.". The activity was focused on the developing of an optical read out for gravitational wave detector
- 3 - March
/ July 2010 **Fraunhofer Institut fur Laser Technick (ILT) Aachen (Germany),** Visiting Scientist. The activity has been focused on demonstration of Dye Solar Cell fabrication via all laser assisted fabrication processes

e) Lecturer activity

- 1 - June 2008,2009,
2010 and
May 2011,2012 **Master of Photovoltaic Engineering of University of Rome Tor Vergata (Rome - Italy).**
Lecturer on the subject "Laser and Photovoltaic"
- 2 - November 2005 **Guide in the Museum of Science "Città della Scienza" Naples - Italy.**

f) Informatics skills:

Good knowledge of OS Windows XP, Windows Vista;

Good knowledge of the application softwares **Office 2000** (Word, Publisher, Excel, Outlook, Power Point), **Microcal Origin for graphing and data analysis**, **Wolfram Matematica** and Cosmos (finite element thermo-mechanical simulations).

Basic knowledge of Matlab, and of the optical CAD Zemax

g) Languages:

Italian: mother language

English: Fluent spoken and written

French: Fluent spoken and written

h) Interests and personal activities

- 1 - Music From 1992 to 2003 I used to be professional bass player in a band playing live music in the southern Italy area
- 2 - Movies From 1995 to 2003 I was involved in a movie makers group. The activity was focused on shooting short movies and organizing movies related events (cinema school, workshops with international movie makers, etc.) in my home town
- 3 - Volunteer activity From 1994 to 2003 I used to be a volunteer workers for the International Civil Service (SCI) and I took part to several international work camps all over the Europe, sometimes as camp leader
- 4 - Sport From 2007 to 2003 I used to practice amateur boxing

i) Patents

- 1 - October 2012 Mincuzzi G., Di Carlo A., Reale A, Brown T.M., "*Sintering Process of Metal Oxides Based Formulations*". International Patent Publication Number WO 2012/140684 A1
- 2 - March 2013 Mincuzzi G., Brown T.M., Di Carlo A., Giordano F., Reale A. "*Process of manufacturing of the catalytic layer of the counter-electrodes of dye-sensitized solar cells*". International Patent Publication Number WO 2013/035118 A1
- 3 - March 2012 Mincuzzi G., Brown T.M., Di Carlo A., Petrolati E., Reale A. "*Process of manufacturing of dye-sensitized solar cells (DSCs) with laser shaping or patterning of the nanocrystalline semiconductor active layer*". Request N° RM2012A000080.

l) Scientific Publications

- 1 - July 2007 A. Lapucci, M. Ciofini, E. Favilla, E. Sani, M. De Rosa, G. Mincuzzi, A.Rocco, "Quantitative analysis of the thermal distortions in a 100 W CW Nd:YAG ceramic slab laser" in *Journal of European Optical Society - Rapid Publications* **2**, 07020 (2007)
DOI:10.2971/jeos.2007.07020.
- 2 - May 2008 P. Malara, P. Maddaloni, G. Mincuzzi, S. De Nicola, P. De Natale "*Non-collinear quasi phase matching and annular profiles in difference frequency generation with focused*

Gaussian beams”, in OPTICS EXPRESS, Vol. 16, Issue 11, (2008) pp. 8056-8066
doi:10.1364/OE.16.008056.

- 3 - June 2009 Mincuzzi G., Vesce L., Riccitelli R. Reale A., Di Carlo A, Brown T. M. “*Laser sintering of photoelectrode layers for dye solar cell technology*”. Proceedings of “European Conference on Laser and Electro-Optics (CLEO) and European Quantum Electronics Conference (EQEC)” IEEE CNF, Munich (Germany), June 2009, p. 1, ISBN: 978-1-4244-4080-1, doi: 10.1109/CLEOE-EQEC.2009.5192160.
- 4 - September 2009 Mincuzzi G., Vesce L., Reale A., Di Carlo A, Brown T. M. “*Efficient sintering of nanocrystalline titanium dioxide films for dye solar cells via raster scanning laser*”. APPLIED PHYSICS LETTERS, vol. 95, September 2009, p. 1033121-1033123, ISSN: 0003-6951 print, ISSN: 1077-3118 online, doi: 10.1063/1.3222915.
- 5 - September 2011 Mincuzzi G., Vesce L., Liberatore M., Reale A., Di Carlo A, Brown T. M. “*Laser-Sintered TiO₂ Films for Dye Solar Cell Fabrication: an Electrical, Morphological and Electron Lifetime Investigation*”. IEEE Transaction on Electron Devices, September 2011, vol. 58, issue 9 pages 3179 3188, ISSN:00189383 DOI:10.1109/TED.2011.2160643.
- 6 - November 2011 Dominici L., Colonna D., D’Ercole D., Mincuzzi G., Riccitelli R., Michelotti F., Brown T.M., Reale A., Di Carlo A. “*Dye solar cells: basic and photon management strategies*”. Solar Cells - Dye-Sensitized Devices - Chap. 13 (2011) - pages 279–318 ed. L. Kosyachenko (InTech, Croatia, 2011).
- 7 - August 2012 Mincuzzi G., Schulz-Ruhtenberg M., Vesce L., Reale A., Di Carlo A., Gillner A., Brown T.M. “*Laser processing of TiO₂ films for dye solar cells: a thermal, sintering, throughput and embodied energy investigation*” Published on-line August 2012 in “*Progress in Photovoltaics*”
- 8 - September 2012 Mincuzzi G., Zardetto V., Vesce L., Schulz-Ruhtenberg M., Gillner A., Reale A., Di Carlo A., Brown T. M. “*Raster Scanning Laser and UV Processing of nanocrystalline TiO₂ Films for Sintering in Dye Solar Cells: Device Performance, Throughput and Embodied Energy*”. MRS Online Proceedings Library, 2012 Volume 1447 DOI:10.1557/opl.2012.1092
- 9 – October 2012 Zardetto V., Mincuzzi G., De Rossi F., Di Giacomo F., Reale A., Di Carlo A., Brown T. M. “*Outdoor and Diurnal Performance of Large Conformal Flexible Metal/Plastic Dye Solar Cells*” Submitted to “*Journal of Applied Energy*”
- 10 – March 2013 Matteocci F., Mincuzzi G., Giordano F., Capasso A., Artuso E., Barolo C., Viscardi G., Brown T.M., Reale A. , Di Carlo A. “*Blocking Layer Optimization of poly(3-hexylthiophene)*

based Solid State Dye Sensitized Solar Cells" in Organic Electronic, July 2013 Vol. 14, Issue 7, pp 1882–1890

11 – March 2013 Vesce L., Riccitelli R., Mincuzzi G., Soscia G., Orabona A., Brown T. M., Di Carlo A., and Reale A. *"Fabrication of Spacer and Catalytic Layers in Monolithic Dye-sensitized Solar Cells"* in IEEE Journal of Photovoltaics, June 2013 Vol. 3, Issue 3, pp. 1004 -1011

12 – July 2012 Mincuzzi G. ,Vesce L., Schulz-Ruthenberg M., Gelen E., Reale A., Di Carlo A., Brown T.M. *"Taking temperature processing out of Dye Solar Cell Fabrication: Fully laser-manufactured devices"*. Submitted to Energy and Environmental Science

m) Scientific Conferences:

1 - June 2006 "6th International Symposium on Advanced Environmental Monitoring". *Heidelberg (Germany)*.

G.Pica, P.Donnarumma, V.Magliulo, L.Nasti, G.Mincuzzi, G.Pisani, N.Spinelli, A.Stohl, X.Wang," *Study of Planetary Boundary Layer evolution in urban/rural sites in Southern Italy*". Poster session

2 - September 2007 "2nd European Optical Society Topical Meeting OMS 07 Optical Microsystem" *Capri (Italy)*.

M. De Rosa, G. Mincuzzi, A. Rocco, P. Ferraro, M. Ciofini, E. Favilla, A. Lapucci, E. Sani, *"Interferometric diagnostic of thermal effects in a high power diode pumped Nd:Yag ceramic slab laser"*. Oral session

3 - April 2009 "International Conference on the Industrialization of DSC (DSC-IC)" *Nara (Japan)*.

Mincuzzi G., Vesce L., Brown T. M., Reale A., Di Carlo A. *"Efficient laser sintering of titanium dioxide layers for dye solar cells"*. Poster session

4 - June 2009 "European Materials Research Society (E-MRS) Spring Meeting" *Strasbourg (France)*.

Mincuzzi G., Vesce L., Brown T. M., Riccitelli R. Reale A., Di Carlo A. *"TiO₂ sintering via UV scanning laser for dye solar cells fabrication"*. Oral session

5 – June 2009 "European Conference on Lasers and Electro-Optics (CLEO) and European Quantum Electronics Conference (EQEC), IEEE CNF" *Munich (Germany)*.

Mincuzzi G., Vesce L., Riccitelli R. Reale A., Di Carlo A, Brown T. M. *"Laser sintering of photoelectrode layers for dye solar cell technology"*. Poster session

- 6 - October 2009 "Nanomaterials for Sustainable Development" *Monteporzio Catone (Italy)*.
Brown T. M., Mincuzzi G., Vesce L., Giordano F., Petrolati E. Guidobaldi A, Reale A., Di Carlo A. "*Materials and processing for dye solar cell technology*". Oral session
- 7 - May 2011 "Laser in Manufacturing" *Munich (Germany)*.
Mincuzzi G., Schulz-Ruhtenberg M., Vesce L., Reale A., Di Carlo A., Gillner A., Brown T.M. "*High Throughput Sintering of nanocrystalline (nc)-TiO₂ Films for Dye Solar Cells (DSC) via Laser*". Oral session
- 8 - June 2011 "International Congress on Organic Electronics" *Rome (Italy)*
Mincuzzi G., Schulz-Ruhtenberg M., Vesce L., Reale A., Di Carlo A., Gillner A., Brown T.M. "*Laser Raster Scanning as an Effective Flexible Fabrication Tool for Sintering of TiO₂ Films for Dye Solar Cells*". Poster session
- 9 - September 2011 "4th EOS Topical Meeting on Optical Microsystems (O μ S'11)" *Capri (Italy)*
Mincuzzi G., Schulz-Ruhtenberg M., Vesce L., Reale A., Di Carlo A., Gillner A., Brown T.M. "Laser sintering of nanocrystalline (nc)-TiO₂ films for Dye Solar Cells (DSCs) fabrication: from process feasibility to high throughput". Oral session
- 10 - April 2012 Materials Research Society (MRS) Spring Meeting and Exhibit *San Francisco (USA)*.
Mincuzzi G., Zardetto V., Vesce L., Schulz-Ruhtenberg M., Gillner A., Reale A., Di Carlo A., Brown T. M. "*Raster scanning laser and UV processing of nanocrystalline TiO₂ films for sintering in dye solar cells: device performance, throughput and embodied energy*". Oral Session
- 11 - September 2012 Second International Meeting on Organic Materials for a Better Future (FUTURMAT2) *Carovigno (Italy)*, "Electrodeposited counterelectrodes for flexible Dye Sensitized Solar Cells". Oral Session

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