PERSONAL INFORMATION

Fiordaliso Elisabetta Maria, 22-09-1981, Italian.

Resident in Denmark since 2007.

Email address: emfi@dtu.dk

CURRENT POSITION

- **Researcher** and **project manager** at DTU Nanolab, Technical University of Denmark.
  Current granted project: Villum Experiment, with title: "*Aim, shoot and dope!* Electron-beam doping of semiconductor nanowires". Content: *In-situ* doping of semiconductor nanowires measured by electron holography.
- **Microsoft collaborator**. Point of contact for MS electron microscopy related activities carried out at DTU Nanolab. Co-supervisor of MS PhD students and supporting MS postdoctoral researchers. Carrying out electron microscopy characterization of relevant materials for quantum devices.

FORMER EMPLOYMENTS and EDUCATION

- 2016-2018: **Postdoctoral position** at the Center for Electron Nanoscopy, Technical University of Denmark. Characterization of doping in heterostructure nanowires by electron holography.
- 2012-2016: **Postdoctoral position** at the Center for Electron Nanoscopy, Technical University of Denmark. *In-situ* experiments of nano catalysts using the Environmental TEM.
- 2008-2012: **PhD student** at the Center for Individual Nanoparticle Functionality, Technical University of Denmark. Title of thesis: "*In-situ characterization of catalyst nanoparticles by ultra-high vacuum surface sensitive techniques and high-pressure experiments*".
- 2005-2007: **Master degree in Condensed Matter Physics** obtained at Pisa University, Italy. Title of thesis**:** "*Temperature dependent high resolution spectroscopy on free fullerene cluster anions C60 and C70*". Experiments performed in a UHV apparatus at **Freiburg University**, Germany.
- 2000-2004: **Bachelor degree in solid state Physics** obtained at Palermo University, Italy. Title of thesis**:** "*X-ray scattering in a sample of water, at different pressures and temperatures*". Experiments performed at the **ESRF synchrotron in Grenoble**, France.

MAJOR COLLABORATORS

- *Prof. P. Krogstrup*, Niels Bohr Institute, Copenhagen, and Microsoft Quantum Materials, Denmark.
- *Prof. J. Nygård*, Danish Quantum Innovation Center and Nanowires for quantum devices, Copenhagen University, Denmark.
- *Prof. R. LaPierre*, Nanowire solar cells, Engineering Physics, McMaster University, Canada.
- *Prof. V. Esposito*, DTU Energy.

SUPERVISION and CO-SUPERVISION of POSTDOCS and STUDENTS

2018-present: Ganapathi Prabhu Sai Balasubramanian, DTU Nanolab.
Hired through my Villum Experiment granted project.

2018-present: Martin Espinera, Microsoft and Copenaghen University.

2017-2020: Martin Bjergfelt. Currently working at Copenhagen University.

2012-2013: Sebastian Kuld. Currently working at Haldor Topsøe.

COMPETENCES

Extensive experience in advanced **electron microscopy techniques** and **sample preparation,** in **surface-sensitive characterization techniques,** in **material science,** in **nanostructures** and **catalysis.** My competences include:

- **Scanning Electron Microscopes** (SEM) and **Transmission Electron Microscopy** (TEM) for high- resolution images of nanomaterials (nanoparticles and nanowires), catalysts and semiconductors.
- **Electron Holography** and **Electron holographic Tomography** on semiconductors materials, to map electrostatic potentials in 2-D and 3-D.
- **Focused Ion Beam** (FIB) to prepare samples for TEM characterization.
- **Environmental TEM** (ETEM), for i*n situ* characterization of catalysts under several gas atmospheres and different temperatures.
- **Energy Dispersive X-ray Spectroscopy** (EDS), **Electron Energy Loss Spectroscopy** (EELS), **Electron Diffraction** to study the composition and crystal structure of the samples.
- **X-ray Diffraction** (XRD) and **In-situ XRD** measurements for crystal phase investigation of powder catalysts under reaction conditions.
- Surface characterization techniques, such as **Auger Electron Spectroscopy** (AES), **Ion Scattering Spectroscopy** (ISS), **X-ray Photoelectron Spectroscopy** (XPS) and **High Resolution Photoelectron Spectroscopy** (HRPES).
- E**xtensive laboratory experience**, working with ultra-high vacuum (UHV) apparatus suitable for clusters and nanoparticles development and for surface characterization. Experience with high-pressure cells and rectors, used for catalytic activities testing.
- S**ynchrotron experience** in Lund Sweden and in Grenoble, France.

TEACHING ACTIVITIES

- 2012-2015: Hands-on teaching of electron microscopy techniques for experimental surface science courses at the Technical University of Denmark, Department of Physics. My role was to create, coordinate and develop experimental projects for students.
- 2015-2018: Regular guest lecturing – Electron microscopy course for graduate students, Technical University of Denmark, Department of Physics, Denmark.

EXTERNAL STAYS and INTERNSHIPS

Feb 2018: Dresden University, Germany. Characterization of 3-D doping distribution in nanowires by electron holographic-tomography.

June 2018: Mc master University, Hamilton, Canada. Growth of solar cell nanowires and characterization by focused ion beam and electron holography.

2006 Internship for master project at Freiburg University, Germany, at the Cluster Physics group of Prof. B. von Issendorff and Prof. H. Haberland, as member of the exchange program European Mobility for Physics Students (EMPS).

2004 Internship at the *ESRF synchrotron* in Grenoble, France, financed by INFM (Istituto Nazionale Fisica della Materia). X-Ray scattering experiments on water clusters have been summarized in the Bachelor's thesis.

2003 Internship at the *nuclear reactor ILL* in Grenoble, France, financed by INFM (Istituto Nazionale Fisica della Materia). Neutron scattering experiments on a water sample have been carried out.

Publication list

- E.M. Fiordaliso, I. Sharafutdinov, H.W. Carvalho, J. Kehres, J.D. Grunwaldt, I. Chorkendorff, C.D. Damsgaard. "Evolution of intermetallic $GaPd_2/SiO_2$ catalyst and optimization for methanol synthesis at ambient pressure". Science and technology of advanced materials (2019), 20(1), 52.

- D.J. Carrad, M. Bjergfelt, T. Kanne, M. Aagesen, F. Krizek, E.M. Fiordaliso, E. Johnson, J. Nygård, T.S. Jespersen. "Shadow Epitaxy for In Situ Growth of Generic Semiconductor/Superconductor Hybrids". Advanced Materials (2020), 32(23), 1908411.

- F. Krizek, Z. Kašpar, A. Vetushka, D. Kriegner, E.M. Fiordaliso, J. Michalicka, O. Man, J. Zubáč, M. Brajer, V.A. Hills, and K.W. Edmonds. "Molecular beam epitaxy of CuMnAs", Physical Review Materials (2020), 4(1), 014409.

- S.A. Khan, C. Lampadaris, A. Cui, L. Stampfer, Y. Liu, S.J. Pauka, M.E. Cachaza, E.M. Fiordaliso, J.H. Kang, S. Korneychuk, T. Mutas, J.E. Sestoft, F. Krizek, R. Tanta, M. C. Cassidy, T.S. Jespersen, P. Krogstrup "Highly Transparent Gatable Superconducting Shadow Junctions". ACS nano (2020).

- Kabir, Ahsanul, Martin Espineira Cachaza, Elisabetta Maria Firodaliso, Daoyao Ke, Salvatore Grasso, Benoit Merle, and Vincenzo Esposito. "Effect of Cold Sintering Process (CSP) on the Electro-Chemo-Mechanical Properties of Gd-doped Ceria (GDC)." Journal of the European Ceramic Society (2020).

- Sanna, Simone, Elisabetta Maria Firodaliso, Takeshi Kasama, Ivano E. Castelli, and Vincenzo Esposito. "Effect of high oxygen deficiency in nano-confined bismuth sesquioxide." Journal of Physics: Energy 2, no. 2 (2020): 024010.

- Didone, Mattia, Sankhya Mohanty, Jesper Henri Hattel, Mads Rostgaard Sonne, Elisabetta Maria Fiordaliso, Alessandro Checchi, and Guido Tosello. "On the drying process of molded pulp products: Experiments and numerical modelling." Drying Technology (2019): 1-19.

- McNamee, Simon, Devan Wagner, Elisabetta M. Fiordaliso, David Novog, and Ray R. LaPierre. "GaP nanowire betavoltaic device." Nanotechnology 30, no. 7 (2018): 075401.

- Bjergfelt, Martin, Damon J. Carrad, Thomas Kanne, Martin Aagesen, Elisabetta M. Fiordaliso, Erik Johnson, Borzoyeh Shojaei et al. "Superconducting vanadium/indium-arsenide hybrid nanowires." Nanotechnology 30, no. 29 (2019): 294005.

- Hakkarainen, Teemu, Marcelo Rizzo Piton, Elisabetta Maria Fiordaliso, Egor D. Leshchenko, Sebastian Koelling, Jefferson Bettini, Helder Vinicius Avanço Galeti et al. "Te incorporation and activation as n-type dopant in self-catalyzed GaAs nanowires." Physical Review Materials 3, no. 8 (2019): 086001.

- C. Roy, B. Sebök, S. B. Scott, **E.M. Fiordaliso**, J.E. Sørensen, A. Bodin, D.Trimarco, C. Damsgaard, P.C.K. Vesborg, O. Hansen, I.E.L. Stephens, J. Kibsgaard, I. Chorkendorff, "*Impact of Size and Lattice Oxygen on Water Oxidation on* $NiFeO_xH_y$", **Nature Catalysis** (2018).

- N. Isik, **E.M. Fiordaliso,** R.R. LaPierre, "*Doping assessment in GaAs nanowires*", **Nanotechnology** (2018) *29*(23), 234001.

- M.H.T. Dastjerdi, **E.M. Fiordaliso**, E.D. Leshchenko, T. Kasama, M. Aagesen, V.G. Dubrovskii, R.R. LaPierre, "*Three-fold symmetric doping mechanism in GaAs nanowires*", **Nano Letters** (2017), 10, 5875-5882.

- W. Lu, Y. Ou, **E. M. Fiordaliso**, Y. Iwasa, V. Jokubavicius, M. Syväjärvi, S. Kamiyama, P. M. Petersen, H. Ou, "*White Light Emission from Fluorescent SiC with Porous Surface*", **Scientific Reports** (2017), 7, 9798.
- S. A. Kondrat, P. J. Smith, P. P. Wells, A. P. Chater, J. H. Carter, D. J. Morgan, **E. M. Fiordaliso,** J. B. Wagner, T. E. Davies, L. Lu, J. K. Bartley, S. H. Taylor, M. S. Spencer, C. J. Kiely, G. J. Kelly, C. W. Park, M. J. Rosseinsky, G. J. Hutchings, "*Stable amorphous georgeite as a precursor to a high-activity catalyst*", **Nature** (2016), Vol. 531, No. 7592, p. 83-87.
- **E. M. Fiordaliso**, I. Sharafutdinov, J. Kehres, C. Gundlach, D. Thomas, I. Chorkendorff, J. B. Wagner, C. D. Damsgaard, "*Intermetallic Pd_2Ga/SiO_2 nanoparticles for low pressure CO_2 hydrogenation to methanol: catalytic performance and in situ characterization*" **ACS Catalysis** (2015), 5.10, 5827-5836.
- H. Silva, M. Nielsen, **E. M. Fiordaliso**, C. Damsgaard, C. Gundlach, T. Kasama, I.; Chorkendorff, D. Chakraborty, "*A Novel Route for the Simple Preparation of Egg-Shell Catalysts through Incipient Wetness Impregnation*" **Applied Catalysis A: General** (2015), 505, 548-556.
- F. Masini, C. E. Strebel, D. N. McCarthy, A. U. F. Nierhoff, J. Kehres, **E. M. Fiordaliso**, J. H. Nielsen, and I. Chorkendorff. "*Methanation on mass-selected Ru nanoparticles on a planar SiO_2 model support: The importance of under-coordinated sites*." **Journal of catalysis** (2013), 308, 282-290.
- **E. M. Fiordaliso**, S. Murphy, R. Nielsen, S. Dahl, I. Chorkendorff, "*H_2 splitting on Pt, Ru and Rh nanoparticles supported on sputtered HOPG*", Surface Science 606 (2012) 263.
- **E. M. Fiordaliso**, S. Dahl, I. Chorkendorff, "*Strong support interaction of Pt and Ru nanoparticles deposited on HOPG probed by the H-D exchange reaction*", **Journal of Physical Chemistry C** 116 (2012), 5773.
- **E. M. Fiordaliso**, S. Dahl, I. Chorkendorff, "*H_2 splitting on Pt/Ru alloys supported on sputtered HOPG*", **Journal of Physical Chemistry C** 115 (2011) 25351.
- Scientific contribution to Open Access Government: https://www.openaccessgovernment.org/nanowire-doping-electron-holography/42996/

- Several oral presentations since 2011 in catalysis, environmental electron microscopy, electron holography and semiconductor nanowires at various international conferences, with the most recent being the Nanowire week, Pisa, 2019.

- Invited speaker at several international conferences.