

July 29, 2017

# Francesco Volpe

Associate Professor of Applied Physics

Department of Applied Physics and Applied Mathematics (APAM)  
Columbia University  
500 W. 120th Street  
204 S W Mudd, Mail Code: 4701  
New York, NY 10027

Tel: +1-212-854-6528  
fvolpe@columbia.edu  
Skype: fra.volpe

*Personal webpage:* [www.apam.columbia.edu/fac-bios/volpe/faculty.html](http://www.apam.columbia.edu/fac-bios/volpe/faculty.html)  
*Volpe group webpage:* [pl.apam.columbia.edu](http://pl.apam.columbia.edu)

*Google Scholar:* [scholar.google.com/citations?user=FUdNhkAAAAJ](http://scholar.google.com/citations?user=FUdNhkAAAAJ)  
*LinkedIn:* [www.linkedin.com/in/francesco-volpe-8a8980116](http://www.linkedin.com/in/francesco-volpe-8a8980116)  
*OrcId:* [orcid.org/0000-0002-7193-7090](http://orcid.org/0000-0002-7193-7090)  
*ResearcherId:* [www.researcherid.com/rid/D-2994-2009](http://www.researcherid.com/rid/D-2994-2009)  
*ResearchGate:* [www.researchgate.net/profile/Francesco\\_Volpe](http://www.researchgate.net/profile/Francesco_Volpe)

## Education

- Ph.D.** **Experimental Physics, *Summa cum Laude*** **2003**  
**Ernst Moritz Arndt Universität Greifswald (Germany)**  
Thesis at the Max-Planck Institut für Plasmaphysik (IPP), Garching (Germany):  
*Electron Bernstein emission diagnostic of electron temperature profile at W7-AS Stellarator.* Advisors: H.P.Laqua and F.Wagner.
- Laurea (B.Sc.)** **Physics, 110 points out of 110, *cum Laude*** **1998**  
**University of Pisa (Italy)**  
Thesis at ENEA Frascati:  
*Collective Scattering of millimeter waves for ion temperature measurements in the FTU tokamak.* Advisors: F.P.Orsitto and F.Pegoraro.  
Electives: Plasma Physics, Statistical Mech., Quantum Field Theory, Experim. Particle Physics

## Research

### Areas of Expertise and Main Accomplishments

- **Magnetohydrodynamic Stability and Stabilization of Plasmas** - Used magnetic perturbations and/or Electron Cyclotron Current Drive (ECCD) for first:
  - Stabilization of a locked mode that would have otherwise caused a disruption [*Phys. Rev. Lett.* 2015]
  - Non-destructive measurement of error-fields from their interaction with rotating modes, at high  $\beta$  [*Nucl. Fusion* 2013 and 2014]
  - Stabilization of Neoclassical Tearing Mode (NTM) by ECCD pulsed and aimed in feedback with oblique Electron Cyclotron Emission (ECE) [*Phys. Plasmas* 2009]

- **Microwave Heating, Current Drive and Diagnostics of Plasmas** - First extension to overdense fusion plasmas, by means of Electron Bernstein Waves (EBWs), of the following techniques formerly restricted to low-density plasmas:
  - Temperature profile diagnostic by ECE [*Rev. Sci. Instrum.* 2003]
  - Generation and detection of heat waves, for heat transport studies [*Rev. Sci. Instrum.* 2003]
  - Ray tracing modeling, including mode conversions and 3D stellarator geometry [*Rev. Sci. Instrum.* 2003]
  - Electron Cyclotron Current Drive (with H.P. Laqua) [*Phys. Rev. Lett.* 2003]
 Also: first diagnostic (spinning mirror) for rapid angular scans of EBW emission, to measure the profile of safety factor,  $q$  [*Rev. Sci. Instrum.* 2010]
- **Stellarator Simplification**
  - First generation of rotational transform by tilted toroidal-field planar coils
  - First coil-misalignment inference from comparison of experimental and numerical flux-surfaces [*Plasma Phys. Contr. Fusion* 2016]
- **Electromagnetic Metamaterials**
  - First metamaterial lens of reverse chromatic aberration by design [*Optics Express* 2012]
- **Liquid Metal Walls**
  - First active electromagnetic stabilization of free-surface flows [*Magnetohydrodyn.* 2017]

## Academic Appointments

- 2015 -date**      **Associate Professor**
- 2012 -15**      **Assistant Professor** Dept Appl. Physics & Appl. Math., **Columbia Univ.**, NY, U.S.A.
- Physics and control of locked modes, NTMs and their relation to disruptions (collab. with GA San Diego and several groups worldwide, under ITPA-WG11)
  - Error Field detection from mode interaction (collab. with KTH Stockholm and GA San Diego).
  - Stellarators: CIRCUS (new, to study coil-simplification), CNT (modified from earlier non-neutral experiment, to study high  $\beta$  stability, overdense heating, error fields and new diagnostics), TARALLO (conceptual, ion source for accelerators).
  - Waves in plasmas - New numerical methods and modeling of new microwave diagnostics of magnetic field.
  - Metamaterial lens of reverse chromatic aberration for microwave diagnostic.
  - Liquid Metal Walls - gravity-defying, free-surface, feedback-stabilized flows.
- 2012, summer**      **Visiting Assistant Professor, Kyoto University, Japan**
- Built radiometer for EBW emission at Heliotron J.
- 2009 -11**      **Assistant Professor** Engineering Physics Dept, **Univ. Wisconsin, Madison**, U.S.A.
- Physics and control of locked modes and NTMs at DIII-D (collab. GA San Diego).
  - Error Field detection from interaction with stable RWMs (collab. KTH Stockholm).
  - Magnetic barriers in plasma edge stochasticized by Resonant Magnetic Perturbations for Edge Localized Mode (ELM) in DIII-D (collab. GA San Diego).
  - NTM dependence on impurities and Lithium wall (collab. PPPL Princeton).
  - Full-wave modeling mode-conversions in Pegasus sph. tok. (collab. IPF Stuttgart).
  - Metamaterials of reverse chromatic aberration

## Research Appointments

- 2008**            **Staff Physicist, Max-Planck-Inst. für Plasmaphysik (IPP)**, Garching, Germany
- Electron Cyclotron Reson. Heating (ECRH) operator, ASDEX Upgrade Tokamak.
  - Fast version of TORBEAM beam/ray tracing code, for real-time use.
  - Feasibility of EBW Current Drive in RFX-mod reversed field pinch (with R. Bilato and IPF Stuttgart).
- 2007 -08**            Oak Ridge Associated Univ. **Post-doctoral Fellow, General Atomics**, San Diego  
**2006 -07**            Otto-Hahn Medal **Post-doctoral Fellow, General Atomics**, San Diego, U.S.A.
- Physics and control of locked modes and NTMs
  - Oblique and horizontal Electron Cyclotron Emission (ECE)
  - Spinning mirror Electron Bernstein Wave (EBW) emission (collab. UKAEA).
- 2006**            **Adv. Training Sch., Max-Planck-Inst. Plasmaphys. (IPP)**, Greifswald, Germany
- Weakly relativistic dielectric tensor valid for arbitrary wavenumbers.
  - Incorporated EBWs and mode conversions in TRAVIS ray tracing (with N.Marushchenko). Interfaced code to EFIT tokamak equilibria (with Yu.Turkin).
- 2004 -05**            **Physicist, Fircroft, UKAEA Fusion**, Culham, U.K.  
**2002 -04**            **Post-doc, UKAEA Fusion**, Culham, U.K.
- Ray tracing, Fokker-Planck optimization of ITER ECRH Upper Launcher for NTM stabilization (with several groups worldwide).
  - EBW emission, heating (exp.) and current drive (num.) at MAST sph.tokamak. Spinning mirror for ang. scan of emission, for  $q$ -profile meas. and heating optimiz.
  - MAST Session Leader<sup>1</sup>
  - Internal collaborations: 1) double-null-merging non-solenoid startup, 2) optics for MAST Interferom., 3) interpretation JET Interferometer signals during ELMs.
  - External: 1) Collective Thomson Scattering (CTS) at FTU (ENEA Frascati), 2) Ray tracing for mode-converted EBWs in TCV tokamak (CRPP-EPFL Lausanne).
- 1998-2002**        **PhD student IPP**, Garching bei München, Germany
- EBW emission measurements at Wendelstein 7-AS (W7-AS) stellarator
  - Analytical solution of OX conversion
  - Ray tracing of mode-converted EBWs, applied to emission and current drive
- 1998, summer**    **Fellow, Consorzio di Magnetofluidodinamica, Univ. of Trieste**, Italy
- 2D finite difference code for liquid metal flows of industrial interest
- 1997 -98**            **Undergraduate student, ENEA**, Frascati (Rome), Italy
- Collective Thomson Scattering (CTS) at FTU tokamak.

<sup>1</sup>A.k.a. physics operator, leads an experimental session, programs the coil-currents, gas injection, density and position feedbacks and gives directives to the pellet, heating and data acquisition operators. His/her aim is to create a plasma with certain characteristics of density, temperature, shape etc., agreed with the physicists in charge of the experiment.

## Securing and Managing Research Funds

Total: > \$1,350,000

- 08/2017 - 07/2018** Department of Energy (DOE), Renewal of DE-SC0016372  
“Island Rotation and Locking at DIII-D”  
PI: Francesco Volpe. Co-PI: Andrew Cole. \$155,000  
*Post-doc starting in 08/2017*
- 08/2016 - 07/2018** National Science Foundation (NSF), PHY-1632802  
“Modeling Ion Extraction from First Toroidal Electron-Cyclotron-Resonance Ion Source”  
PI: Francesco Volpe. \$194,000  
*Post-doc starting in 07/2017*
- 08/2016 - 07/2017** Department of Energy (DOE), DE-SC0016372  
“Physics and Control of Disruptive Locked Modes at DIII-D”  
PI: Francesco Volpe. \$175,000  
*Trained 2 graduate students, 1 undergraduate. 1 PhD thesis. 1 journal paper.*
- 07/2012 - 07/2016** Department of Energy (DOE), DE-SC008520  
“Physics and Control of Locked Modes in the DIII-D Tokamak” (Early Career Award)  
PI: Francesco Volpe. \$600,000  
*Trained 2 post-docs and 2 graduate students. 1 PhD thesis. 12 journal papers. 6 invited talks at int. conferences. 1 major software (eigspec). 1 database (locked modes and disruptions).*
- 07/2011 - 07/2012** Department of Energy (DOE), DE-SC0006415  
“Physics and Control of Locked Modes in the DIII-D Tokamak” (Early Career Award)  
PI: Francesco Volpe. \$150,000  
*Trained 2 graduate students, 1 undergraduate. 2 journal papers.*
- 05/2011 - 05/2012** Graduate School, Univ. of Wisconsin, Madison  
“Electron Bernstein Wave Studies in the MST Plasma Experiment”  
PI: Francesco Volpe. \$57,126  
*Calibrated MST radiometer. Built: low-noise amplifiers, hot/cold calibration source.*
- 08/2010 - 09/2010** General Atomics  
“Analysis of Locked Mode Control”  
PI: Francesco Volpe. \$26,437  
*1 invited talk at international conference.*

Under preparation:

- 06/2018 - 05/2021** Department of Energy (DOE), Pre-proposal PRE-0000012195 encouraged to proceed with full submission in response to Funding Opportunity DE-FOA-0001762  
“Rotating and Locked Magnetic Islands in DIII-D: Advancements in Theory, Experiment and Control”  
PI: Francesco Volpe. Co-PI: Andrew Cole. \$1,050,000

## Honors, Fellowships and Awards

- 2015** Excellence in Fusion Engineering Award, Fusion Power Associates, USA
- 2012** Visiting Professorship in Kyoto University, Japan
- 2012** Finalist at ISSNAF Award for Young Investigators
- 2012** Torkil Jensen Award, General Atomics
- 2011** DOE Early Career Award
- 2007** Oak Ridge Associated Universities (ORAU) Fellowship
- 2003** Otto-Hahn Medal - thesis prize of the Max-Planck Gesellschaft (Germany)
- 2002** Marie Curie Individual Fellowship, European Commission Research Directorate

## Publications and other Research Products

### Publication and Citation Summary

6 journal articles under review

**65 journal articles** published

20 refereed IAEA conference papers

113 conference papers, reports and other publications

**h-index** = 14 and >600 citations according to ISI Web of Knowledge

(<http://www.researcherid.com/rid/D-2994-2009>).

**h-index** = 19 and >1,000 citations according to Google Scholar.

### Selected Publications

Criteria for selection: *Physical Review Letters* and/or highly cited journal articles ( $\geq 25$  citations).

For the full list of publications, please refer to <http://www.columbia.edu/~fv2168/Publ/1Pub.pdf>.

- F.A. Volpe, A. Hyatt, R.J. La Haye, M.J. Lanctot, J. Lohr, R. Prater, E.J. Strait, A. Welander  
**Avoiding Tokamak disruptions by applying static magnetic fields that align locked modes with stabilizing wave-driven currents**  
*Phys. Rev. Lett.*, **115**, 175002 (2015)
- H. Meyer, R.J. Akers, F. Alladio, F. Volpe and 106 coauthors  
**Overview of Physics Results from MAST**  
*Nucl. Fusion* **49**, 104017 (2009)
- B. Esposito, G. Granucci, S. Nowak, F. Volpe and 10 coauthors  
**Disruption Control on FTU and ASDEX Upgrade with ECRH**  
*Nucl. Fusion* **49**, 065014 (2009)
- F.A.G. Volpe, M.E. Austin, R.J. La Haye, J. Lohr, R. Prater, E.J. Strait and A.S. Welander  
**Advanced techniques for neoclassical tearing mode control in DIII-D**  
*Phys. Plasmas* **16**, 102502 (2009)
- R. Prater, D. Farina, Yu. Gribov, R.W. Harvey, Y.R. Lin-Liu, E. Poli, A.K. Ram, A.P. Smirnov, F. Volpe, E. Westerhof, A. Zvonkov and ITPA Steady State Operations Topical Group  
**Benchmarking of codes for electron cyclotron heating and electron cyclotron current drive under ITER conditions**  
*Nucl. Fusion* **48**, 035006 (2008)
- V. Shevchenko, G. Cunningham, A. Gurchenko, E. Gusakov, B. Lloyd, M. O'Brien, J. Preinhaelter, A. Saveliev, A. Surkov, F. Volpe, M. Walsh  
**Development of Electron Bernstein Wave Research in MAST**  
*Fusion Science & Technology* **52**, 202 (2007)
- A. Mueck, L. Curchod, Y. Camenen, S. Coda, T.P. Goodman, H.P. Laqua, A. Pochelon, L. Porte, F. Volpe, TCV Team  
**Demonstration of Electron-Bernstein-Wave Heating in a Tokamak via O-X-B Double-Mode Conversion**  
*Phys. Rev. Lett.* **98**, 175004 (2007)

- W.A.Houlberg, C.Gomezano, J.F.Artaud, F.Volpe and 20 coauthors  
**Integrated Modeling of the Current Profile in Steady-State and Hybrid ITER Scenarios**  
*Nucl. Fusion* **45**, 1309 (2005)
- F.Wagner, S.Bäumel, J.Baldzuhn, F.Volpe and 49 coauthors  
**W7-AS: One step of the Wendelstein stellarator line**  
*Phys. Plasmas* **12**, 072509 (2005)
- H.P.Laqua, H.Maassberg, N.Marushchenko, F.Volpe, A.Weller, W7-AS Team, W.Kasperek and ECRH-Group  
**Electron-Bernstein-Wave Current Drive in an Overdense Plasma at the Wendelstein 7-AS Stellarator**  
*Phys. Rev. Lett.* **90**, 75003 (2003)
- F.Volpe, H.P.Laqua and the W7-AS Team  
**BXO mode-converted electron Bernstein emission diagnostic (invited)**  
*Rev. Sci. Instrum.* **74**, 1409 (2003)

## Talk Summary

13 invited talks at international conferences, +4 invited talks by group members  
50 seminars and colloquia  
3 summer school lectures  
44 contributed talks at international conferences

## Selected Invited Talks at International Conferences

For the full list of talks, please refer to <http://www.columbia.edu/~fv2168/Publ/1Pres.pdf>.

- **Using 3D Fields to control Islands, aid ECCD-Stabilization and measure Error-Fields at DIII-D**  
41st European Physical Society (EPS) Conf. on Plasma Physics, Berlin (Germany), June 2014
- **Advanced Techniques for Neoclassical Tearing Mode Control in DIII-D**  
50th Annual Meeting, Division of Plasma Phys., American Phys. Society (APS), Dallas, TX, Nov. 2008
- **BXO mode-converted electron Bernstein emission diagnostic of electron temperature profiles at W7-AS Stellarator**  
14th Topical Conf. High Temperature Plasma Diagnostics (HTPD), Madison, WI, July 2002

## Patents

“Systems and methods for adjustable aberration lens”

US Publication No.: WO/2014/004918, US Publication Date: 03.01.2014

International Application No.: PCT/US2013/048337 International Filing Date: 27.06.2013

## Teaching and Lecturing

### Courses taught

at Columbia University:

Fall	2015 -17	APPH E4200x	<b>Physics of Fluids</b>	undergraduate level also taught remotely on Columbia Video Network (CVN)
Spring	2012 -17	APPH E4018y	<b>Applied Physics Laboratory<sup>2</sup></b>	undergraduate level
Fall	2012 -14	APPH E6101y	<b>Plasma Physics I</b>	graduate level

at the University of Wisconsin, Madison:

Fall	2009 & Spring	2011	ECE 525	<b>Introduction to Plasmas</b>	undergrad level
Spring	2010 & Fall	2011	NE 427	<b>Nuclear Instrumentation Laboratory</b>	undergrad level

### Lectures given

- Lecture on “Locked Mode Disruptions: Stability, Dynamics, Control” at the 9th ITER International School, “Physics of disruptions and control”, 20-24 March 2017 Aix-en-Provence (France)
- Lecture on “Waves in Plasmas” at the Mirai Summer School, 9-10 August 2012, Suzukaji (Japan)
- Lecture on “Plasma Waves and Heating” at the IPP Summer University on Plasma Physics and Fusion Research, 22-26 Sept. 2008 Garching (Germany)

## Research Advising, Group Members

Total of 55 people in the last 18 years, most of them in the last 9 years, both at Universities (Columbia Univ. and UW-Madison) and National Facilities (GA San Diego and IPP Garching).

### Current Group

- Post-docs
  2. **Wilkie Choi** (starting Aug. 2017) *Island Rotation and Locking in DIII-D Tokamak*
  1. **Sharad K. Yadav** (starting Aug. 2017) *Modeling Ion Extraction from First Toroidal Electron-Cyclotron-Resonance Ion Source*
- Undergraduates (6)

**Jacob Austin** (2017-), **Shah Faisal Bin Mazhar** (2017-), **Veronica Mulila** (2017-), **Tommy Polanco** (2017-), **Albert Tai** (2017-), *all working on tilted toroidal-field coil torsatron (CIRCUS);* **Ruben Rui Diaz-Pacheco** (2015-) *also worked on CNT stellarator and liquid metal exp.*

### Previous Group Members

- Scientists
  2. **Claudia Caliri** (2013-14) *Ion extraction from toroidal plasma-based ion source for accelerators*
  1. **Myunghye Choi** (2013) *Numerical Modeling of Waves in Plasmas*
- Visitors and unfunded collaborators

---

<sup>2</sup> Laboratory of vacuum, microwaves, solid state, plasmas, superconductivity and optics.

3. **Orso Meneghini** (collaborated from GA San Diego, 2013)  
*Full-wave Feasibility Study of Mode-Conversion Oblique Reflectometry Imaging of q-profile*
  2. **Xabier Sarasola** (visited Columbia from IPP Greifswald, 2012)  
*Operation of CNT as a Neutral Stellarator*
  1. **Alf Köhn** (visited UW from IPF Stuttgart, 2010) *Full-wave Modeling of EBWs in Pegasus*
- Post-docs
    3. **Seyyed (Taha) M.H. Mirhoseini** (2015-16) *Control of liquid metal flows and walls*  
currently engineering manager at RDO Induction
    2. **Erik Olofsson** (2012-14) *Physics and Control of Locked Modes at DIII-D*  
currently a scientist at General Atomics
    1. **Daisuke Shiraki** (2012-13) *Physics and Control of Locked Modes at DIII-D*  
currently a scientist with Oak Ridge National Laboratory (ORNL) seconded to DIII-D
  - PhD Theses
    3. **Wilkie Choi** (2013-17) *Magnetic feedback control of 2/1 locked modes in tokamaks*  
starting a DOE-funded Columbia post-doc at DIII-D in Aug. 2017
    2. **Kenneth Hammond** (2012-17) *Heating and stability of neutral CNT stellarator plasmas*  
currently at post-doc at IPP Greifswald, Germany
    1. **Ryan Sweeney** (2012-16) *Relationship between locked modes and disruptions in the DIII-D tokamak*, currently a Monaco Post-doctoral Fellow at ITER
  - MSc students (11)
 

**Michel Doumet** (2013-14), **Anthony Clark** (2012-13), **Aileen Nielsen** (2012), **Chuteng Zhou** (2012), **William J. Capecchi** (2011-12), **Kent Haeger** (2011), **Sang-heum Kim** (2010), **Dinh Truong** (2010-12), **Sara Gallian** (2010), **Derek Thompson** (2009), **François Beaudé** (2009-10)
  - Undergraduates (25)
 

**Tyler Cowan** (2016-17), **Jessica Li** (2016-17), **Justin Mann** (2015-17), **Ben Yehuda Israeli** (2013-17), **Yumou Wei** (2015-16), **Jacob B. Simmonds** (2015-16), **Alek Anichowski** (2015), **Lucas Randall Zeppetello** (2014-15), **Anji Zhao** (2014-15), **Omar Naziruddin Mahmood** (2014-15), **Elise Burch** (2013-14), **Yosef Kornbluth** (2013), **Adrian Febre** (2013), **Scott Massidda** (2012-13), **Samuel Reiss** (2010-11), **Mohamad Ali Bitar** (2010), **Kyle Luh** (2010), **Jonathan Jacquot** (2010), **Shifan Mao** (2009-11), **Jonathan Kessler** (2010), **Hans Rinderknecht** (2007), **2 groups of 2 students** (Technische Universität München, Plasma interferometry experiment (2000-01))

## Service

### Service to Columbia

- APAM Department Student Admissions and Financial Aid Committee member (2016-date).
- Applied Physics (AP) Program Committee member (2015-date).
- General AP Undergraduate Advisor (2015-date).
- Speaker & guide for Columbia Engineering Days on Campus, for admitted undergraduates (2014-date).
- Chair or member of 8 Thesis Defense committees and 6 Thesis Proposal committees (2012-date).
- Advisor of undergraduates majoring in AP, class of 2016 (2014-16).
- Organizer of weekly Plasma Physics Colloquia (2012-15 and 2016-date).
- Organizer of weekly APAM Research Conference seminars (2012-14).



## Service to UW-Madison

Member of several Thesis Defense committees and Preliminary Examination committees (2009-11).

## Community Research Leadership

- 2014** Member of National Stellarator Coordination Committee
- 2013-date** Invited Leader of International Tokamak Programmatic Activities (ITPA) Working Group 11, “Control of Locked Modes”.

## Conference Organization and Selection Committees

- *Member* of International Advisory Board of 5th and 4th International Conf. Frontiers in Diagnostic Technologies, Frascati (Italy), March-April 2018 and 2016
- *Member* of Program Committee of
  - 21th Workshop on MHD Stability Control, San Diego, CA (USA), Nov. 2016
  - 20th Workshop on MHD Stability Control, Princeton, NJ (USA), Nov. 2015
  - 19th Workshop on MHD Stability Control, Auburn, AL (USA), Nov. 2014
  - 18th Workshop on MHD Stability Control, Santa Fe, NM (USA), Nov. 2013
  - 16th Workshop on MHD Stability Control, San Diego, CA (USA), Nov. 2011
- *Chair* of Local Organizing Committee 15th Workshop on MHD Stability Control combined with “US-Japan Workshop on 3D Magnetic Field Effects in MHD Control”, Madison, WI (USA), Nov. 2010.

## Reviewer for Funding Agencies

- 2016 -date** National Science Foundation (NSF)
- 2011 -date** US Department of Energy (DOE)
- 2016** Research Foundation Flanders (FWO)
- 2016** Italian Scientists and Scholars of North America Foundation
- 2014** Chilean National Commission for Scientific and Technological Research
- 2013** Swiss National Science Foundation
- 2012** Helmholtz Stiftung (Germany)
- 2004** Czech Science Foundation

## Reviewer for Journals and Book Publishers

- Regular referee, since 2003, for *Nucl. Fusion* and for *Plasma Phys. Control. Fusion*.
- Ad-hoc referee, since 2006, for other 18 journals and book publishers: *Appl. Phys. Lett.*, *Fusion Eng. Design*, *Fusion Sci. Technol.*, *IEEE Trans. Plasma Sci.*, *J. Appl. Phys.*, *J. Infrared Millim. Terahertz Waves*, *J.Phys.D: Appl. Phys.*, *J. Plasma Phys.*, *Phys. Lett. A*, *Phys. Plasmas*, *Phys. Rev. E*, *Phys. Rev. Lett.*, *Plasma Sci. Technol.*, *Plasma Sources Sci. T.*, *Radiation Eff. Defect S.*, *Rev. Sci. Instrum.*, *Springer Books*, *Waves Random Complex Media*.

## Outreach

- 2016-date** Scientific advisor for “Blackout”, a Sloan-awarded film on a nuclear fusion scientist, written and directed by Nick Singer
- 2014-date** School tours of CNT Plasma Laboratory.
- 2010-11** Judge at the CSEF and BSSEF Science Fairs (UW-Madison and Marquette University, Milwaukee, WI)

- 2006-07** "Scientist in the Classroom": lectures and demonstrations organised by PPPL and General Atomics in schools of Southern California
- 2004-05** Toured dozens of groups (hundreds of visitors) from schools, universities and general public around MAST and COMPASS tokamaks at Culham, UK.

## Other Information

### Professional Associations

- 2010** -date US-BPO United States Burning Plasma Organization
- 2008** -date APS American Physical Society and its Division of Plasma Physics (DPP)
- 2009 -16** UFA University Fusion Association
- 2011 -12** ISSNAF Italian Scientists and Scholars of North America Foundation
- 2011 -12** AAAS American Association for the Advancement of Science
- 2010 -11** IEEE Institute of Electrical and Electronics Engineers and its Microwave Theory and Techniques Society (MTT-S) and Nuclear & Plasma Sciences Society (NPSS)

### Further Training Received

- *Project Management* (Greifswald, Germany, 2006),
- All major schools in plasma physics and controlled fusion: Greifswald (1997), Trieste (1999), Carolus Magnus (2001), Culham (2004).
- Specialistic schools in plasma physics: *Ionospheric Plasma Physics* (Greifswald, Germany, 2004), *MAST Session Leader<sup>1</sup> Training* (Culham, UK, 2004), EFDA "GOTiT" *Course on Gyrokinetics* (Garching, Germany, 2008), *Instabilities in Laboratory, Space and Astrophysical Plasmas* (UCLA, USA, 2008),
- Scientific software training: FEMLAB (2004), LabView (2010), COMSOL (2010).
- Other: *Advanced Turbulent Flow Computations* (CISM Udine, Italy, 1998), *Magnets, Cryogenics, Thermometry and Vacuum* (Oxford Instruments, UK, 2004), *Bayesian Analysis* (Culham, UK, 2005), STEM Education Scholars Program by CIRTLL (Nashville, USA, 2009), CERN Accelerator School on RF for Accelerators (Ebeltoft, Denmark, 2010).

### Languages

Only most advanced class or certificate is indicated for each language.

- 1) **Italian** native
- 2a) **English** proficient (Certificate in English Language Skills (CELS) "Higher", English for Speakers of Other Languages (ESOL), University of Cambridge, 2004)
- 2b) **Spanish** proficient (Classes at University of California San Diego "Extension", 2006-07)
- 4) **German** proficient (*Zertifikat Deutsch*, Goethe Institut München, 2000)
- 5) **French** elementary (20% fluent on DuoLingo, 2016)
- 6) **Portuguese** elementary (17% fluent on DuoLingo, 2016)
- 7) **Japanese** elementary (Classes at Amity College New York and Kyoto University, 2012)