

**GIUSEPPE STRANGI****FULL PROFESSOR OF PHYSICS**

Department of Physics, University of Calabria, Rende - Italy

**Email:** giuseppe.strangi@fis.unical.it**Education**

1996	University of Calabria, Italy	M.S. in Physics "Laurea"
2000	University of Calabria, Italy	Ph.D. in Physics
2000-01	University of Colorado at Boulder, USA	Post-Doc

**Professional Career**

2019 -	Full Professor of Physics – University of Calabria, Italy
2012 -	Full Professor of Physics and General Medical Sciences, Case Western Reserve University (CWRU), USA
2012 -	Endowed Chair - Ohio Research Scholar in Surfaces of Advanced Materials (CWRU) USA
2016 - 2017	Primo Ricercatore CNR Italy – Institute of Nanotechnology (on sabbatical leave from CWRU)
2002 – 2012	Researcher and Associate Professor of Applied Physics, University of Calabria, Italy
2001 - 2002	Visiting Researcher, MRS Center, University of Colorado at Boulder, USA
2001 - 2001	Research Scientist, Dept. R&D of STmicroelectronics Inc, Catania, Italy.
2000 - 2001	Postdoctoral Scholar, University of Colorado at Boulder, USA
1997 - 2000	PhD Student, University of Calabria, Italy

**Other Experiences and Professional Memberships**

- Director and Principal Investigator, NANOPLASM Laboratories at Case Western Reserve University (USA)
- President, Scientific Committee of the Foundation "Con Il Cuore", Italy
- General Chair, International Conference "NANOPLASM – New Frontiers in Plasmonics and Nano-Optics" (2014 - Present).
- Co-Chair Scientific Initiative "From Life To Life" promoted by The National Academy of Lincei (2015) - Italy
- Co-PI, National Science Foundation collaborative project between research centers FLCMRC-LICRYL (NSF DMR-0302060)
- Workpackage Leader - WP4 - European Project EU FP7 -NMP3 2009 "Nanochemistry and Self-Assembly Routes to Metamaterials for Visible Light - METACHEM".
- Member Elected - Steering Committee of the Italian Liquid Crystal Society - SICL (2010 – 2018).
- Member, Doctorate School in Science and Technologies of Mesophases and Molecular Materials "Bernardino Telesio" (2003 – 2013).
- Member, Advising Scientific Committees of International Conferences and Workshops "LC Photonics 2014", "SICL 2010-12-14-16-18", "NOMA 2012 – 2014 - 2016", "B. Telesio International Doctoral Schools 2003-2013" "Nanoplasm 2014-16-18" and "Metamaterials 2018 - 2020".
- Member Elected, Governing Board of the European project EU- FP7 "METACHEM" (9 Research Institutions of Seven European Countries) NMP3-SL-2009 228762 (2009 – 2013).
- Fellow, Institute of Science of the Origins, CWRU USA
- Fellow, Case Comprehensive Cancer Center – Cleveland (USA)
- Fellow, Optical Society of America (OSA);
- Member, "Institute for Advanced Materials" Case Western Reserve University, Cleveland (USA).
- Member, CEMIF.CAL "Centre of Excellence for the Study of Innovative Functional Materials" Italy
- Member and Visiting Professor, Italian Institute of Technology - IIT, Genoa, Italy
- Senior Researcher, National Research Council (CNR-NANOTEC), Italy;
- Member, American Physical Society (APS);
- Member, Italian Physical Society (SIF);

**Honors and Awards**

- Premio Pitagora 1987 – Liceo Filolao, Italy (1987)
- Premio Giovani Ricercatori – UNICAL (2001)
- Ohio Third Frontier Eminent Scholar Award, CWRU Cleveland - USA (2012)
- Endowed Chair Professorship, CWRU, USA (2012)
- Filottete Prize - Italy (2015)
- International Prize " Il Faro" Pollino National Park (2016)
- Premio Legambiente - Italy (2016)
- Pilot Project Award, Case Comprehensive Cancer Center (2016)
- 2016 Team Science Challenge Award, University Hospitals Cleveland (2016)
- Rotary International "Professionalism Award" (2018)
- American Physical Society Award – Metamaterials 2019 – Rome (Italy)
- OSA Fellow - 2021

**Major Professional Interests**

- Nanotechnologies at the interface between Physics and Medicine
- Nanophotonics and Plasmonics
- Cancer Nanotechnology, Biosensing and Neuroplasmonics
- Metamaterials and Extreme Optics
- Optics and Photonics in Soft Matter
- Nanolasers and Mirrorless Microlasers
- Ultrafast Laser Spectroscopy
- Quantum Metamaterials

**International Patents**

- G. Strangi, E. Cazzanelli, C. Versace, R. Bartolino, N. Scaramuzza, D. E. Lucchetta, A. Pennini, F. Simone . "A Method for Fabricating Nematic Electro-optic Cells With Polarity Controlled Response by means Insertion of Thin Films of WO<sub>3</sub> In Liquid Crystal Cells". Patent N°. **GE99A-000087** (1999).
- R. Bartolino, N. Scaramuzza, D. E. Lucchetta, Strangi G., C. Versace, E. S. Barna, A. TH. Ionescu L. M. Blinov " A Method for Fabricating Nematic Electro-optic Cells With Polarity Controlled Response ". Patent N°. **GE99A-000086** (1999).
- R. Bartolino, L. De Sio, C. P. Umeton, G. Strangi, S. Ferjani "Method to fabricate polymeric matrix to confine soft and biological matter "Patent N° **CZ2009 A000021** (2010).
- G. Strangi, K. V. Sreekanth, U. A. Gurkan, M. Hinczewski and M. ElKabbash, "Optical sensor platform employing hyperbolic metamaterials". **US Patent N. 15/684,071** (2020)

**Dr. Strangi has delivered more than 100 Invited Talks and Colloquia at International Institutions and Conferences****Peer-Review and Related Activities (among others)**

Reviewer for Nature Materials, Nature Photonics, Nature Communications, Physical Review/Physical Review Letters, Applied Physics Letters, Journal of Applied Physics, Optics Letters, Journal of Optical Society of America, Small, Langmuir, ACS Nano, Optics Express, Nano Letters, Applied Physics Letters, Optics Communications, Applied Optics, Photonics Technology Letters, IEEE Journal of Selected Topics in Quantum Electronics, Among many others.

### Book and Book Chapters

- **Random Lasing in Liquid Crystals** By G. Strangi, V. Barna, A. De Luca, S. Ferjani, C. Versace Transworld Research Network Edited By L.M. Blinov And R. Bartolino, Kerala, India (2010).
- Active Plasmonic Nanomaterials: Chapter Entitled **“Plasmon-Gain Interplay In Optical Metastructures”** By G. Strangi Et Al, Pan Stanford Publishing, Edited by L. De Sio Singapore (2014)
- Grating Coupled Hyperbolic Metamaterials” K.V. Sreekanth, A. De Luca, And G. Strangi: Book Title: **Anisotropic Nanomaterials: Preparation, Properties, And Applications** Edited By Quan Li - *Springer New York (September 2015)*
- From Life To Life: Through New Materials and Plasmonics - Rendiconti Lincei Springer – edited by G. Strangi, A. De Luca And R. Bartolino ( SPRINGER & Accademia Nazionale dei Lincei - 2015)
- G. Strangi, K. V. Sreekanth, and M. Elkabbash, **“Hyperbolic metamaterials-based ultra-sensitive plasmonic biosensors for early stage cancer detection”**, Book titled **“Next generation point-of-care biomedical sensors technologies for cancer diagnosis**, ISBN: 978-3-981-10-4725-1 (Springer, 2017).
- Sreekanth K. V., Mohamed Elkabbash, Vincenzo Caligiuri, Ranjan Singh, Antonio De Luca, and Giuseppe Strangi Book: **“New Directions in Thin Film Nanophotonics”** - Progress in Optical Science and Photonics ISBN: 978-981-13-8890-3. ISBN: 978-981-13-8891-0. NATURE – SPRINGER Singapore (2019)

### Principal Publications (15 out of 180+)

- 1) Strangi G, Versace C, Scaramuzza N and R. Bartolino *Photopolarimetric characterization of the transition between two turbulent states in a nematic liquid crystal film* **PHYSICAL REVIEW E** 59 Issue: 5 Pages: 5523-5527 (1999)
- 2) Strangi G, Lucchetta DE, Cazzanelli E, et al. *Asymmetric electro-optical response in a liquid crystal cell containing a layer of amorphous tungsten trioxide* **APPLIED PHYSICS LETTERS** Volume: 74 Issue: 4 Pages: 534-536 (1999)
- 3) Strangi G, Barna V, Caputo R, et al. *Color-tunable organic microcavity laser array using distributed feedback* **PHYSICAL REVIEW LETTERS** Volume: 94 Issue: 6 Article Number: 063903 (2005)
- 4) Carbone F, Sorriso-Valvo L, Versace C, Strangi G, Bartolino R *Anisotropy of spatiotemporal decorrelation in electrohydrodynamic turbulence.* **PHYSICAL REVIEW LETTERS** vol. 106, ISSN: 1079-7114 (2011).
- 5) De Luca A, Grzelczak MP, Pastoriza-Santos I, Liz-Marzan LM., La Deda M, Striccoli M, Strangi G *Dispersed and Encapsulated Gain Medium in Plasmonic Nanoparticles: a Multipronged Approach to Mitigate Optical Losses* **ACS NANO**, vol. 5, p. 5823-5829, (2011).
- 6) K. V. Sreekanth, A. De Luca, and G. Strangi *“Experimental demonstration of surface and bulk plasmon polaritons in hypergratings,”* **SCIENTIFIC REPORTS** (Nature Publishing Group) 3, 3291 (2013).
- 7) Melissa Infusino, Antonio De Luca, Alessandro Veltri, Carmen Vázquez-Vázquez, Miguel A. Correa-Duarte, Rakesh Dhama, and Giuseppe Strangi *Broadband induced transparency in porous plasmonic mesocapsules soaked with gain.* **ACS PHOTONICS**, 1 (4), pp 371–376 (2014)
- 8) Kandammathe V. Sreekanth, Yunus Alapan, Mohamed Elkabbash, Efe Ilker, Michael Hinczewski, Umut A. Gurkan, Antonio De Luca & Giuseppe Strangi *“Extreme sensitivity biosensing platform based on hyperbolic metamaterials”* **NATURE MATERIALS** 15, 621-627 (2016)
- 9) K. V. Sreekanth, Y. Alapan, M. Elkabbash, Amy M. Wen, Efe Ilker, M. Hinczewski, U. A. Gurkan, Nicole F. Steinmetz and G. Strangi *“Enhancing the Angular Sensitivity of Plasmonic Sensors Using Hyperbolic Metamaterials”* **ADVANCED OPTICAL MATERIALS** (2016), DOI: 10.1002/adom.201600448
- 10) Elkabbash, Mohamed, Alireza R. Rashed, Betul Kucukoz, Quang Nguyen, Ahmet Karatay, Gul Yaglioglu, Ekmel Ozbay, Humeyra Caglayan & Giuseppe Strangi. *“Ultrafast Transient Optical Loss Dynamics In Exciton–Plasmon Nano-Assemblies.”* **NANOSCALE** 9 (19): 6558–66. (2017)
- 11) S. Perumbilavil, A. Piccardi, R. Barboza, O. Buchnev, M. Kauranen, G. Strangi, and G. Assanto, *“Beaming random laser with soliton control”* **NATURE COMMUNICATIONS** 9, Article number: 3863 (2018)
- 12) Maccaferri, Nicolo; Zhao, Yingqi; Isoniemi, Tommi; Strangi, Giuseppe, De Angelis Francesco *Hyperbolic Meta-Antennas Enable Full Control of Scattering and Absorption of Light* **NANO LETTERS** 19 3 1851-1859 (2019)

- 13) Elkabbash, M, Miele, E; Fumani, AK ; Wolf, MS; Bozzola, A; Haber, E ; Shahbazyan, TV ; Berezovsky, J ; De Angelis, F, Strangi. *G Cooperative Energy Transfer Controls the Spontaneous Emission Rate Beyond Field Enhancement Limits* **PHYSICAL REVIEW LETTERS** 122, 20 203901 (2019).
- 14) Lininger A., Zhu A. Y., Park J. -S., Palermo G., Chatterjee S., Boyd J., Capasso F., Strangi G. (2020). Optical properties of metasurfaces infiltrated with liquid crystals. **PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA**, vol. 117, p. 20390-20396, ISSN: 1091-6490, doi: 10.1073/pnas.2006336117 2 2020
- 15) M. Elkabbash, T. Letsou, S. Jalil, N.I Hoffman, J. Zhang, J. Rutledge, C. H. Fann, M. Hinczewski and G. Strangi, Fano-resonant ultrathin film optical coatings **NATURE NANOTECHNOLOGY** <https://doi.org/10.1038/s41565-020-00841-9> (2021)

#### **INTERNATIONAL MEDIA COVERAGE (Selected list)**

- The Telegraph - London: <http://www.telegraph.co.uk/news/2016/03/28/cancer-patients-could-see-if-chemotherapy-is-working-in-real-time/>
- Rai News: <http://www.rainews.it/dl/rainews/media/Basta-la-Salute-Sanita-in-Calabria-nanotecnologie-e-animali-selvatici-55eac204-537f-478e-b148-081e70b1373d.html> (starts at minute 8:58)
- Nature Materials: <http://www.nature.com/nmat/journal/vaop/ncurrent/full/nmat4609.html>
- EurekaAlert: [http://www.eurekaalert.org/pub\\_releases/2016-03/cwru-crm032516.php](http://www.eurekaalert.org/pub_releases/2016-03/cwru-crm032516.php)
- Science Daily: <https://www.sciencedaily.com/releases/2016/03/160328114632.htm>
- Phys.Org: <http://phys.org/news/2016-03-biosensor-million-sensitive.html>
- Kurzweil: <http://www.kurzweilai.net/a-biosensor-thats-1-million-times-more-sensitive>
- Azosensors: <https://www.azosensors.com/News.aspx?newsID=10985>
- CNR News: <https://www.cnr.it/it/news/6610/nanosensore-basato-su-metamateriali-per-la-diagnosi-iniziale-dei-tumori>
- The Daily CWRU - <http://thedaily.case.edu/cwru-researchers-make-biosensor-1-million-times-more-sensitive/>
- Research Italy: <https://www.researchitaly.it/en/news/tumour-early-diagnosis-with-nanotechnology/>
- India Today: <https://www.indiatoday.in/pti-feed/story/new-highly-sensitive-biosensor-may-detect-cancer-early-581596-2016-03-30>
- LAB Roots: <https://www.labroots.com/trending/cancer/2853/optical-sensor-1-million-times-sensitive-cancer-detection>
- E&T Magazine: <https://eandt.theiet.org/content/articles/2016/03/new-sensor-million-times-better-at-spotting-cancer/>
- Biotecnika.org: <https://www.biotecnika.org/2016/03/revolutionary-ultra-sensitive-biosensor-change-cancer-diagnosis/>
- Medical Dialogue- New York: <https://speciality.medicaldialogues.in/ultra-sensitive-biosensor-could-revolutionise-cancer-diagnosis/>
- Financial Tribune: <https://financialtribune.com/articles/economy-sci-tech/38845/iranian-helps-develop-ultra-sensitive-nanosensor>
- NPR Radio: <http://radio.wosu.org/post/new-biosensor-1-million-times-more-sensitive-current-technology#stream/0>
- Science Daily: <https://www.sciencedaily.com/releases/2018/10/181023150026.htm>
- Nature Photonics: <https://www.nature.com/articles/s41566-018-0296-z>
- Photonics Views: <https://www.photonicsviews.com/first-proof-of-a-transistor-random-laser/>
- The Daily CASE: <https://thedaily.case.edu/new-laser-breakthrough/transistor-random-laser/>
- Photonics.com: [https://www.photonics.com/Articles/International\\_University\\_Team\\_Demonstrates\\_New/a64176](https://www.photonics.com/Articles/International_University_Team_Demonstrates_New/a64176)