

Sotirios A. Mallios

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Personal Info

Father's name: Anastasios

Born: on 14 Feb 1981 at Athens / Attiki

Military service: Fulfilled

Orchid ID

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ResearcherID

B-7630-2019

Education

2015 Ph.D. in Electrical Engineering, Pennsylvania State University

Thesis Title *A Study of the Contribution of Thunderstorms to the Global Electric Circuit Using a Time-Dependent Numerical Model and a Fractal Model*

2005 B.Sc. in Physics, National and Kapodistrian University of Athens

Seminars and Schools

04/06/2009 - 04/11/2009: 8th **School of Fusion Physics and Technology**, in the frame of the research program "National Program of Controlled Thermonuclear Fusion"

04/14/2008 - 04/18/2008: 7th **School of Fusion Physics and Technology**, in the frame of the research program "National Program of Controlled Thermonuclear Fusion"

03/26/2007 - 03/31/2007: 6th **School of Fusion Physics and Technology**, in the frame of the research program "National Program of Controlled Thermonuclear Fusion"

04/18/2005 - 04/22/2005: 4th **School of Fusion Physics and Technology**, in the frame of the research program "National Program of Controlled Thermonuclear Fusion"

05/22/2003 - 05/27/2003: 2th **School of Fusion Physics and Technology**, in the frame of the research program "National Program of Controlled Thermonuclear Fusion"

04/16/2002 - 05/21/2002: **School of Fusion Physics and Technology**, in the frame of the research program "National Program of Controlled Thermonuclear Fusion"

Employment record

January 2019 - Today

Postdoctoral Researcher at the React Group, Institute for Astronomy, Astrophysics, Space Applications and Remote Sensing, **National Observatory of Athens**, Greece

Study of the electrical interaction between dust particles and the atmosphere, and its effect on the dust particles dynamics, Scientific Supervisor *V. Amiridis*

November 2016 - March 2018

Co-Founder, Head of Data Analysis Department at Metis Cyberspace Technology, Kallithea, Greece

Designed and developed a work-flow for data analysis, and numerical models for the quantification of vessel's performance.

- Developed algorithms for data pre-processing and processing (e.g. interpolation, integration, differentiation, outliers removal, synchronization).
- Developed analysis for the ship main engine performance based on shop tests and sea trials reference lines.
- Developed numerical models for the vessel hull and propeller fouling quantification.
- Developed numerical models for several kind of vessel resistances calculation (e.g. wind, waves, swells, rudder).

September 2015 - June 2016

Data Analyst - Customer Success Manager, at the LAROS Division of Prisma Electronics S.A., Alexandroupolis, Greece

Studied energy efficiency, power management, and performance's optimization of ships.

- Deep understanding and knowledge of physical processes regarding a ship's operation under different navigation conditions.
- Validation and processing of raw data.
- Implementation of data analysis methods.
- Interpretation of analysis results.
- Analysis results visualization.
- Performed training on analysis methods.
- Implementation of maritime regulations for vessel efficiency monitoring.
- Data analysis consultancy services and customer support on data analysis.
- Presales technical support.

August 2010 - May 2015

Research Assistant, at the Atmospheric Electrodynamics Group, Electrical Engineering Department, Pennsylvania State University

Studied the contribution of Thunderstorms and Transient Luminous Events in the Global Electric Circuit, Scientific Supervisor *V. P. Pasko*.

- Developed a numerical code for the solution of the current continuity equation, coupled with the Poisson equation, for the calculation of the charge dynamics at the ionosphere and at the ground during different stages of a thunderstorm life cycle.
- Developed a fractal code for the calculation of the electrical properties of different types of lightning discharges.
- Developed a fluid model for the study of the interaction between the thunderstorm charges with the atmospheric fair weather ion densities.

January 2008 - May 2010

Researcher, at the R&D Department in Athens of Prisma Electronics S.A., Alexandroupolis, Greece

Designed and developed the operating system ISOS (Intelligence Sensor Operating System), the drivers and the communication protocols for wireless sensors network.

This operating system has been successfully applied in the following projects:

- “DYNAMITE: Dynamic Decision in Industrial Maintenance”, co-funded by the European Commission.
- “pMaint: Predictive Maintenance”, co-funded by the General Secretariat for Research and Technology
- “MEMSENSE: Developing of Autonomous and Smart Electromechanical Sensing Devices”.
- It is the core operating system of LAROS smart collector devices.

Designed and developed an evaluation board for wireless transmission integrated circuits in the R&D project “NexGenMilliWave”.

March 2001 - May 2010

Research Assistant, at the Microwave and Optics Application Group, Faculty of Physics, **National and Kapodistrian University of Athens**

Participated in the research program “National Program of Controlled ThermoNuclear Fusion (NPCTF)”, cofunded by the European Union and the General Secretariat for Research and Technology, Scientific Supervisor *I. G. Tigelis*

- Examined and developed code for calculation of the electromagnetic field distribution of several kinds of waveguides
- Examined the electromagnetic characteristics of several complex structures using simulation tools
- Solved and developed code for calculation of beam-wave interaction on several electromagnetic devices
- Examined electromagnetic field distribution in plasma filled devices using simulation tools

Academic Honors

Visited several times the Center of Research in Plasma Physics of Federal Technical University of Lausanne (Centre des Recherches en Physique de Plasmas, Ecole Polytechnique Federale de Lausanne) for research collaboration in the frame of research program NPCTF

Student Poster Competition, Honorable Mention, 2011 CEDAR Summer Workshop, 26 June - 1 July 2011, Santa Fe, New Mexico, USA

Ernest K. Smith Student Prize Paper Competition, Third Prize, 2013 USNC–URSI, 9–12 January 2013, Boulder, Colorado, USA

AGU Outstanding Student Paper Award Competition, Honorable Mention, 2014 Fall Meeting, AGU, 15-19 Dec., 2014, San Francisco, CA, USA

Publications

Refereed Journals

S. A. Mallios, E. Drakaki, V. Amiridis, *Corrigendum to “Effects of dust particle sphericity and orientation on their gravitational settling in the Earth’s atmosphere” [Journal of Aerosol Science 150 (2020) 105634]*, *J. Aerosol Sci.*, 153, 2021

V. Daskalopoulou, **S. A. Mallios**, Z. Ulanowski, G. Hloupis, A. Gialitaki, I. Tsikoudi, K. Tassis, and V. Amiridis, *The electrical activity of Saharan dust as perceived from surface electric field observations*, *Atmos. Chem. Phys.*, 21, pp. 927–949, 2021

S. A. Mallios, V. Daskalopoulou, V. Amiridis, *Orientation of non spherical prolate dust particles moving vertically in the Earth's atmosphere*, J. Aerosol Sci., 151, 2021

S. A. Mallios, E. Drakaki, V. Amiridis, *Effects of dust particle sphericity and orientation on their gravitational settling in the earth's atmosphere*, J. Aerosol Sci., 150, 2020

A. J. G. Baumgaertner, G. M. Lucas, J. P. Thayer, and **S. A. Mallios**, *On the role of clouds in the fair weather part of the global electric circuit*, Atmos. Chem. Phys., 14, pp. 8599–8610, 2014

Sotirios A. Mallios and Victor P. Pasko, *Reply to comments on the article by S. A. Mallios and V. P. Pasko "Charge transfer to the ionosphere and to the ground during thunderstorms"*, J. Geophys. Res., 119(3), pp. 2363–2364, 2014

Sotirios A. Mallios, Sebastien Celestin and Victor P. Pasko, *Production of very high potential differences by intracloud lightning discharges in connection with terrestrial gamma ray flashes*, J. Geophys. Res., 118(2), pp. 912–918, 2013

Sotirios A. Mallios and Victor P. Pasko, *Charge transfer to the ionosphere and to the ground during thunderstorms*, J. Geophys. Res., 117(A8), 2012

Sotirios A. Mallios, George P. Latsas, Ioannis G. Tigelis, *TE waves in arbitrary periodic slow-wave structures with rectangular grooves*, Journal of Infrared, Millimeter and Terahertz Waves, vol. 30, No. 10, pp. 1113-1122, October 2009

Vasilis G. Salis, **Sotirios A. Mallios**, Ioannis G. Tigelis, Aristidis S. Theodorou, *Optimized 90 Polarization Shift Step Twists for Ku, K and Ka Bands*, International Journal of Infrared and Millimeter Waves, vol. 28, no. 4, pp. 291-298, April 2007

Z. Ioannidis, **S. Mallios**, I. Paraskevopoulos, and I. G. Tigelis, *Axisymmetric waves in re-entrant cavities*, Radiophysics and Quantum Electronics, vol. 46, no. 11, pp. 860-867, 2003

Non Refereed Journals

Jeremy Pachter, **Sotirios Mallios**, Andreas Baumgaertner, Victor Pasko, *Development of an Efficient Reference Conductivity Model for Global Electric Circuit Model Calculations*, NSF EE REU Penn State Annual Research Journal, Vol. XI, pp. 1–14, 2013

Conferences, Workshops, Meetings

Drakaki, E., Tsekeri, A., Amiridis, V., Solomos, S., Gkikas, A., Proestakis, E., Spyrou, C., **Mallios, S.**, Marinou, E., Ryder, C. L., and Katsafados, P., *A modeling insight into the transport of large dust particles*, EGU General Assembly 2021, online

Mallios, S., Daskalopoulou, V., Skoubris, E., Hloupis, G., Papaioannou, A., Amiridis, V., *A 3D Time-Dependent Model for the Study of the Electrification of Non Spherical Dust Particles due to Ion Attachment*, EGU General Assembly 2020

V. Daskalopoulou, **S. A. Mallios**, Z. Ulanowski, G. Hloupis, and V. Amiridis, *Indications of Saharan dust electrification from surface electric field observations in Greece*, AGU Fall Meeting 2019, San Francisco, California, USA

V. Daskalopoulou, V. Amiridis, **S. A. Mallios**, G. Hloupis, E. Skoubris, and Z. Ulanowski, *Monitoring Saharan dust electrification in Greece: Data retrievals, physical concepts & future planning*, COST Action CA15211 - Electronet, 5th MC meeting, Sopron, Hungary

V. Daskalopoulou, **S. A. Mallios**, Z. Ulanowski, G. Hloupis, A. Gialitaki, and V. Amiridis, *Monitoring of Saharan dust electrification using a ground based electrometer in Crete & Antikythera*, EGU General Assembly 2019, Vienna, Austria

S. A. Mallios, J. Jansky, and V. P. Pasko, *A Time-Dependent Fluid Model for the Study of the Electrical Properties of Global Electric Circuit (GEC) Sources*, AGU Fall Meeting 2014, San Francisco, California, USA

S. A. Mallios, J. Jansky, and V. P. Pasko, *A Time-Dependent Model of GEC Sources and Their Influence on the Ambient Conductivity Distribution*, FESD "Electrical Connections and Consequences Within the Earth System" Meeting, July 21, 2014, Boulder, Colorado, USA

Andreas J. G. Baumgaertner, **Sotirios A. Mallios**, Jeff Thayer, *Conductivity-model parameterization for the effect of non-electrified clouds to the Global Electric Circuit*, ICAE 2014, Norman, OK, U.S.A

S. A. Mallios, J. Jansky, and V. P. Pasko, *Effects of Ion Advection on the Charge Dynamics Inside Storms*, FESD "Electrical Connections and Consequences Within the Earth System" Meeting, February 10, 2014, Boulder, Colorado, USA

S. A. Mallios, and V. P. Pasko, *Time-Dependent Model of the Global Electric Circuit*, AGU Fall Meeting 2013, San Francisco, California, USA

S. A. Mallios, W. Deierling, C. Kalb, D. Mach, and V. P. Pasko, *The Role of Different Types of Lightning, Flash Rates, and Conductivity on the Wilson Currents Above Thunderstorms, Based on Experimental Measurements*, FESD "Electrical Connections and Consequences Within the Earth System" Meeting, July 1, 2013, Boulder, Colorado, USA

S. A. Mallios, and V. P. Pasko, *Single Dipole Configurations for Different Kinds of Storms*, FESD "Electrical Connections and Consequences Within the Earth System" Meeting, July 1, 2013, Boulder, Colorado, USA

Jeremy Pachter, **Sotirios Mallios**, Andreas Baumgaertner, Victor Pasko, *Development of an Efficient Reference Conductivity Model for Global Electric Circuit Calculations*, FESD "Electrical Connections and Consequences Within the Earth System" Meeting, July 1, 2013, Boulder, Colorado, USA

S. A. Mallios, and V. P. Pasko, *Time-Dependent Model of the Global Electric Circuit*, CEDAR Workshop 2013, Boulder, Colorado, USA

S. A. Mallios, and V. P. Pasko, *Time-Dependent Modeling of Global Electric Circuit Processes*, FESD "Electrical Connections and Consequences Within the Earth System" Meeting, February 28, 2013, Boulder, Colorado, USA

S. A. Mallios, S. Celestin, and V. P. Pasko, *Production of very high potential by intra-cloud lightning in connection with terrestrial gamma ray flashes*, USNC-URSI National Radio Science Meeting 2013, Boulder, Colorado, USA

S. A. Mallios, S. Celestin, and V. P. Pasko, *Production of very high potential in intra-cloud lightning in connection with terrestrial gamma ray flashes*, CEDAR Workshop 2012, Santa Fe, New Mexico, USA

S.A. Mallios, V.P. Pasko, *Charge transfer to the ionosphere and to the ground during thunderstorms*, 2011 AGU Fall Meeting, 5 - 9 December 2011, San Francisco, California, USA

S.A. Mallios, V.P. Pasko, *Charge transfer to the ionosphere and to the ground during thunderstorms*, 2011 CEDAR Summer Workshop, 26 June - 1 July 2011, Santa Fe, New Mexico, USA.

S.A. Mallios, I. G. Tigelis, G. P. Latsas, S. Alberti, *Characteristics of Electromagnetic Waves in Complex Electrodynamical Devices*, 8th School of Fusion Physics and Technology, 6 – 11 April 2009, Volos, Greece

G. P. Anastasiou, **S. A. Mallios**, J. L. Vomvouridis, I. G. Tigelis, D. J. Frantzeskakis, *Electromagnetic Waves In A Coaxial Waveguide With Circumferential Corrugations*, 14th Joint Workshop on Electron Cyclotron Emission and Electron Cyclotron Resonance Heating (EC-14), 9 – 12 May 2006, Santorini, Greece, pp. 553-557

G. P. Latsas, Z. C. Ioannidis, **S. A. Mallios**, A. A. Maragos, and I. G. Tigelis, *Waveguide structures with surface corrugations*, 29th International Conference on Infrared and Millimeter Waves, 27 September – 1 October 2004, Karlsruhe, Germany, W3.4, p. 479.

Technical Reports

S. A. Mallios, G. P. Latsas, I. G. Tigelis, and S. Alberti, *Calculation of electromagnetic field distribution in overmoded cylindrical waveguide filled with isotropic plasma*, Annual Report for National Program Of ThermoNuclear Fusion, 2008

S. Mallios, I. Tigelis, S. Alberti, E. Tsilis, *Calculation of electromagnetic field distribution in overmoded waveguide with and without transition*, Annual Report for National Program Of ThermoNuclear Fusion, Annex XXIV, 2007

G. P. Latsas, I. G. Tigelis, **S. Mallios**, G. Anastasiou, D. J. Frantzeskakis, G. Alexakis, *Studies of the interaction of TM Modes with an electron beam in a beam – loaded corrugated waveguide with losses*, Annual Report for National Program Of ThermoNuclear Fusion, Annex IV, 2006

G. P. Latsas, M. Dehler, **S. Mallios**, I. G. Tigelis, S. Athanasopoulou, G. Alexakis, *Numerical Code (Beam Fishbone) for the calculation of TE and TM waves in a beam-loaded corrugated waveguide with losses*, Annual Report for National Program Of ThermoNuclear Fusion, Annex IV, 2005

G. P. Anastasiou, **S. A. Mallios**, M. Dehler, I. G. Tigelis, D. J. Frantzeskakis, *Mathematical Formulation and Numerical Code (CBT) for the calculation of TM and TE waves in a coaxial waveguide with circumferential corrugations*, Annual Report for National Program Of ThermoNuclear Fusion, Annex VI, 2005

G. P. Latsas, G. P. Anastasiou, Z. C. Ioannidis, **S. Mallios**, V. Salis, I. G. Tigelis, D. Frantzeskakis, G. Alexakis, E. Tsilis, *Numerical Code (Beam Fishbone) for the calculation of TE and TM waves in a beam-loaded corrugated waveguide with losses*, Annual Report for National Program Of ThermoNuclear Fusion, Annex IV, 2004

Z. C. Ioannidis, G. P. Latsas, G. P. Anastasiou, **S. Mallios**, V. Salis, I. G. Tigelis, D. Frantzeskakis, G. Alexakis, E. Tsilis, *Full Wave Approach for Coaxial Gyrotron Cavities with Azimuthally Corrugated Insert*, Annual Report for National Program Of ThermoNuclear Fusion, Annex V, 2004

Z. Ioannidis, **S. Mallios**, I. Paraskevopoulos, I. G. Tigelis, D. Frantzeskakis, G. Alexakis, E. Tsilis, *High Frequency Electromagnetic waves in re-entrant cavities*, Annual Report for National Program Of ThermoNuclear Fusion, Annex II, 2001

Referee

Journal of Geophysical Research–Space Physics
Journal of Geophysical Research–Atmospheres

Skills

Computer Languages: C, C++, Fortran, Visual Basic, Assembly

Operating Systems: DOS, Windows, Linux, UNIX

Software: CST Studio Suite, CST Mafia, Ansoft HFSS, Microwave Office, Matlab, Mathematica, LaTeX, Adobe Illustrator

Languages: Greek (Native); English; German