MARK GOLKOWSKI

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Campus Box 110, 1200 Larimer St. P.O. Box 173364, Denver CO 80217

EDUCATION

Ph. D. Stanford University, Electrical Engineering Jan. 2009
Thesis: Magnetospheric Wave-injection by Modulated Heating of the Auroral Electrojet

M.S. Stanford University, Electrical Engineering Jun. 2004
Concentration: electromagnetics and communications

B.S. Cornell University, Electrical Engineering (MAGNA CUM LAUDE) Jan. 2002

AWARDS AND RECOGNITIONS

University of Colorado Denver Excellence in Research May 2019
Campus level award given to one faculty member annually in recognition of outstanding performance in research and creative activities.

University of Colorado Denver Excellence in Teaching May 2016
Campus level award given to one faculty member annually in recognition of outstanding instruction, effective facilitation of learning and innovation in the classroom.

University of Colorado Denver Graduate School Dean's Mentoring Award May 2015

National Science Foundation CAREER Award Aug. 2013
CAREER: Whistler Mode Wave Propagation, Amplification and Coupling
NSF's prestigious award for junior faculty who exemplify the role of teacher-scholars.

College of Engineering and Applied Science Outstanding Faculty in Research May 2013
University of Colorado Denver College of Engineering and Applied Science annual award given in recognition of overall research excellence, impact on society.

Chang Junior Faculty Research Award Feb. 2012
Research funding award to assistant professors with proven research achievement

IEEE Electromagnetic Compatibility Society Best Symposium Paper Award Aug. 2011
A Novel Method for Determining the Lower Bound of Antenna Efficiency

Young Scientist Award for Excellence: IAGA - VERSIM Workshop Sep. 2008
VLF Triggered Emissions Excited by the HAARP HF Ionospheric Heater

American Geophysical Union Travel Grant Jun. 2006
Funds to attend XIIth IAGA Workshop on Geomagnetic Observatory Instruments, Data Acquisition and Processing in Belsk, Poland

Outstanding Student Paper Award: American Geophysical Union, Fall Meeting Dec. 2005
Subionospheric VLF Signatures of Electron Precipitation Induced by Whistler-mode Chorus (Oral Presentation)

Rank 8th out of 182 in Ph.D Qualifying Exam Jan. 2004
Stanford University Electrical Engineering

Magna Cum Laude: Bachelor of Science, Cornell University Jan. 2002

Thomas S. Foulkes '52 ME Prize for Collaborative Communications Sep. 2000

The Role of the Submarine in Naval Warfare

Superior student teamwork on an Engineering Communications project (cash prize)

PROFESSIONAL AND RESEARCH EXPERIENCE

Department Chair Aug. 2022- present

University of Colorado Denver, Dept. of Electrical Engineering

- Lead a department of 12 fulltime faculty, 3 fulltime staff, and 8 part-time instructors
- Represent college of engineering in campus budget and revenue allocation committee
- Led the department through ABET accreditation audit in 2023
- Created 4 course certification in Quantum computing in collaboration with Dept. of Physics
- Authored department strategic plan

Associate Dean of Education and Student Success Mar. 2021- Feb. 2023

University of Colorado Denver, College of Engineering, Design and Computing

- Manage a staff of three direct reports in recruitment, outreach and advising
- In charge of execution of college and university strategic plans in areas of education and student success.
- Responsible for adjudicating student grievances
- Support efforts of 5 departments to create and continuously improve pedagogy and curricula
- Led creation of 4 new micro-credentials in various technical topics
- Developed and steward processes and policies related to education and student success
- Member of campus Strategic Plan Committee
- Member of Common Core Curriculum Oversight Committee
- Member of Strategic Enrollment Committee
- Member of Inclusive Excellence Council and author of College of Engineering DEI Plan
- Developed College of Engineering tutoring and undergraduate advising strategy
- Manage outreach efforts to local school districts
- PI on educational proposals and grants to NSF, Dept. of Education, and Department of Labor, and Department of Defense

Honorary Commander Space Force Delta 4 Mar. 2022 – Mar. 2024

- Space Force Delta 4, Buckley Space Force Base, Aurora Colorado
- Local civic leader chosen by Air Force to increase public awareness of Space Force mission
- Foster a supportive relationship between military and local community

Professor Jun. 2019- present

University of Colorado Denver, Dept. of Electrical Engineering

- Lead externally funded research enterprise consisting of 2 faculty members, 2 postdocs, graduate and undergraduate students supported with grants from DARPA, NASA and NSF
- Led curriculum committee responsible for revamping EE curriculum to emphasize machine learning, data analysis and computing
- Led department ABET committee to update course assessment process

Co-founder, Board Member, Consultant, Jun. 2002- present

Super Pulse/Sterifre Medical,

- Venture funded startup company exploiting nonthermal plasmas in biomedicine
- Co-wrote and edited 2 SBIR phase II funded proposals, 4 SBIR phase I funded proposals
- Main technical presenter in $11.8M Series A Capital Raise (completed May 2018)
- Common share holder director of board

Scientific Advisory Board Member Aug. 2015- present

American Nanotechnologies Inc. (ANI), Denver, CO

- Early stage startup company founded by CU Denver alum

- Assist in RF experiment design and SBIR proposal writing

Associate Professor Jun. 2015- Jun. 2019
University of Colorado Denver, Dept. of Electrical Engineering
- Lead independent externally funded research in electromagnetics and plasma physics: $1.1 million in funds as PI and $2.4 million as co-PI.
- Supported and mentored research group of BS, MS, PhD students and postdocs
- Department of Electrical Engineering PhD Program Coordinator (Aug 2012- Aug 2017)

Interim Department Chair Aug. 2017 – Dec. 2017
University of Colorado Denver, Dept. of Electrical Engineering
- Served as chair during ABET accreditation audit
- Helped arrange donation of $60,000 reverberation chamber from ETS-Lindgren for teaching and research

Assistant Professor Jan. 2010- Jun. 2015
University of Colorado Denver, Dept. of Electrical Engineering (courtesy appointment in Dept. of Bioengineering)
- Independent externally funded research in electromagnetics and plasma physics: $935,907 as PI.
- Investigation of medical applications of non-thermal plasmas including animal trials
- Theoretical and experimental assessment of new thermo-acoustic biomedical imaging techniques

Postdoctoral Fellow Jan. 2009- Jan 2010
Stanford University, Very Low Frequency (VLF) Group under Prof. Umran Inan
- Established coherence limits of wave-particle interactions in the Earth's magnetosphere
- Investigated global electric circuit using ELF/VLF observations, Schumann resonances and ionospheric potential

Doctoral Research Assistant Sept. 2002- Dec 2008
Stanford University, Very Low Frequency (VLF) Group under Prof. Umran Inan
- Investigated use of ionospheric heaters in exciting wave-particle interactions in the Earth's magnetosphere in the ELF/VLF band
- Designed and deployed custom hardware for radio observations in Alaska and magnetic conjugate point in South Pacific Ocean
- Conducted active experimental transmissions using USAF HAARP 3.6 MW ionospheric heater in Alaska

Research Interests
- Wave-particle interactions in plasmas, especially non-linear cyclotron resonance
- Electromagnetics of near-Earth space environment: ionospheric remote sensing, active experiments, numerical modeling
- Applications of non-thermal plasma processing in medicine
- Electromagnetic waves and the human body, novel imaging technologies
- Engineering and STEM education

TEACHING EXPERIENCE

Assistant/Associate/Full Professor University of Colorado Denver Jan 2010 - present
- Initiated new graduate course EE5433: *Fundamentals and Applications of Plasmas.*
- Primary instructor for first two semesters of undergraduate electromagnetic theory: ELEC 3133 *Electromagnetic Fields*, ELEC 4133 *Advanced Electromagnetic Fields*
- Initiated new laboratory course using $40K alumni donation: ELEC 4233 *RF Laboratory*
- Taught graduate level core curriculum course in Bioengineering Department: BIOE 5020 *Quantitative Methods for Bioengineers* Fall 2010, 2011

- Wrote proposal which established PREP Fellowship Program at NIST Laboratories which has supported 6 students and 1 postdoc
- Above average student evaluations in all courses taught (5.5/6.0)

Teaching Fellow Stanford University Spring 2008
- Graduate course EE356: *Introduction to Plasma Physics.*
- Full responsibility for course content and instruction

Teaching Assistant to Prof. Umran S. Inan, Stanford University Spring 2006
- Graduate course EE356: *Introduction to Plasma Physics*
- Guest lectured, created and graded homework sets and exams, held weekly tutorial sessions

English Teacher at Beijing Front Practical Management School in Beijing, China Summer 2002
- Taught college level intensive English emersion class, 6 hours of instruction, 6 days a week
- Created curriculum, evaluated students

PROFESSIONAL SERVICE

Chair Commission H (Waves in Plasmas) U. S. National Committee URSI Jan 2021-Jan 2024
Vice-Chair Commission H (Waves in Plasmas) U. S. National Committee URSI Jan 2018-Dec 2020
Secretary Commission H (Waves in Plasmas) U. S. National Committee URSI Jan 2015 – Dec 2017

Associate Editor *Earth Moon Planets* Springer Scientific Journal Oct. 2011- Jun. 2015
- International journal of solar system science, ISSN: 0167-9295 (print) ISSN: 1573-0794 (electronic)
- Managed review process and decisions for submitted manuscripts

C-TRIC Scientific Staff Member Sep. 2010-2012
- C-TRIC: Colorado Translational Research Imaging Center - University of Colorado Denver Anschutz Medical Campus
- Multidisciplinary team to foster creative translational discovery using state-of-the art imaging facilities

Steering Committee Member Ionospheric Interactions Workshop April 2011-present
- Planning of annual scientific meeting on active ionospheric research with ~70 attendees from academia, industry and government.
- Hosted meeting at CU Denver in May 2017

FOREIGN LANGUAGES

English (fluent), Polish (fluent), German (proficient), French (command), Spanish (command)

RECENT RESEARCH FUNDING

Project Title: **Collaborative Research: Remote Sensing of the Lower Ionosphere during Solar Eclipse**, PI
Dates: 2/1/2024--1/30/2026
Funding Source: National Science Foundation
Total Award Amount: $244,218

Project Title: **Controlled Whistler Mode Wave Injection Experiments with the HAARP Facility**, PI
Dates: 8/1/2023--7/30/2026
Funding Source: National Science Foundation
Total Award Amount: $378,011

Project Title: **Denver Metro Engineering Consortium (DMEC) Cooperative Agreement: Broadening Participation in Community College Transfer Pathways by Building "College Capital,** Institution PI
Dates: 9/1/2022--8/31/2028
Funding Source: U.S. Department of Defense (DoD) National Defense Education Program
Total Award Amount: $767,078

Project Title: **Applications to Assist in Analysis and Re-Engineering of Printed Circuit Board Assemblies** Phase I**,** PI
Dates: 2/1/2024--7/31/2024
Funding Source: Defense Microelectronics Activity (DMEA) STTR collaboration with TDA
Total Award Amount: $30,000

Project Title: **Novel Approach to Mitigating Communication Blackout during Hypersonic Flight Phase II,** PI
Dates: 12/8/2020--5/31/2021
Funding Source: Air Force STTR collaboration with Tech-X Corporation
Total Award Amount: $245,000

Project Title: **Novel Approach to Mitigating Communication Blackout during Hypersonic Flight Phase I,** PI
Dates: 12/8/2020--5/31/2021
Funding Source: Air Force STTR collaboration with Tech-X Corporation
Total Award Amount: $50,000

Project Title: **HEARTBEAT: Heliosphere to Earth Atmosphere Rendering Through Building Excellent Artificial-intelligence Training,** PI
Dates: 4/1/2019--3/30/2022
Funding Source: Defense Advanced Research Projects Agency (DARPA)- via subcontract from Georgia Tech
Total Award Amount: $826,000

Project Title: **Cold Plasma Density Structures in the Inner Magnetosphere and their Effects on Whistler Mode Wave Propagation, Coherence, and Wave-Particle Interactions** PI
Dates: 2/1/2019--1/31/2022
Funding Source: National Aeronautics and Space Administration (NASA)
Total Award Amount: $520,128

Project Title: **MARBLE: (Multi-agent Autonomy with Radar-Based Localization for Exploration)** Co-PI (CU Denver PI is Dr. Ronald Rorrer)
Dates: 9/1/2018--8/30/2022
Funding Source: Defense Advanced Research Projects Agency (DARPA)- via subcontract from CU Boulder
Total Award Amount: $1,350,000

Project Title: **BLING: (Broadband Low-frequency Imaging with Novel Generation)** Co-PI (PI is Dr. Vijay Harid)
Dates: 12/1/2017--5/31/2019
Funding Source: Defense Advanced Research Projects Agency (DARPA)
Total Award Amount: $1,000,000

Project Title: **Collaborative Research: Analysis and Modeling of Nonlinear Wave-Particle Interactions from the Siple Transmitter Experiment** PI
Dates: 9/16/2016--8/30/2019
Funding Source: National Science Foundation

Total Award Amount: $242,881

Project Title: **Quantitative Analysis of Lightning's Multifaceted Impact on the Ionosphere** PI
Dates: 9/1/2015--8/30/2018
Funding Source: National Science Foundation
Total Award Amount: $240,158

Project Title: **Hi-speed Plasma Science (HiPS) to Enable Advanced Radiation Devices** PI
Dates: 10/1/2016-9/30/2017
Funding Source: Defense Advanced Research Projects Agency (DARPA) – via subcontract from Georgia Tech
Total Award Amount: $98,794

Project Title: **VAIPER: Very-short Antennas via Ionized Plasmas for Efficient Radiation** PI
Dates: 7/1/2015-6/30/2018
Funding Source: Office of Naval Research – via subcontract from Georgia Tech
Total Award Amount: $111,000

Project Title: **ADVICE: Advanced Diagnostics for VLF Ionospheric Channel Estimation** PI
Dates: 5/14/2015--8/15/2016
Funding Source: Defense Advanced Research Projects Agency (DARPA) – via subcontract from University of Florida
Total Award Amount: $417,000

Project Title: **Thermo-Acoustic Technology: A Novel Approach to Medical Imaging** PI
Dates: 7/1/2014--6/30/2015
Funding Source: University of Colorado Denver Center for Faculty Development
Total Award Amount: $2,000

Project Title: **CAREER: Whistler Mode Wave Propagation, Amplification, and Coupling** PI
Dates: 3/1/2013--2/28/2016
Funding Source: National Science Foundation
Total Award Amount: $405,749

Project Title: **The Influence of Terrestrial ELF/VLF Waves on Radiation Belt Energetic Electron Dynamics** PI
Dates: 4/1/2011--4/30/2013
Funding Source: Air Force Research Laboratory
Total Award Amount: $137,585

Project Title: **Observation and Modeling of LEP Events** PI
Dates: 7/1/2010--6/30/2014
Funding Source: Defense Advanced Research Projects Agency (DARPA) – via subcontract from University of Florida
Total Award Amount: $352,000

Project Title: **HAARP Magnetospheric Wave Injection** PI
Dates: 4/1/2010--3/31/2011
Funding Source: Air Force Research Laboratory
Total Award Amount: $48,158

Project Title: **Non-thermal Plasma for Live Tissue Disinfection** PI
Dates: 6/1/2010--12/31/2011
Funding Source: University of Colorado Denver Center for Faculty Development
Total Award Amount: $2,000

PUBLISHED BOOKS

Inan and **Golkowski**, *Principles of Plasma Physics for Scientists and Engineers* Cambridge University Press, 284 pages, ISBN: 9780521193726, 2011.

PATENTS

Golkowski, Czeslaw, Rick Shea, Jonathan W. Greene, **Mark. Golkowski,** Danwei Ye, Robert Allen, Ben Parker, Sergey Makarov, and Jason R. Ertel. "Devices, systems, and methods for sterilization, disinfection, sanitization and decontamination." U.S. Patent 11,344,643, issued May 31, 2022.

Golkowski, Czeslaw, Rick Shea, Jonathan W. Greene, **Mark Golkowski**, Anya Golkowski, and Tom Steffie. "Sterilization, disinfection, sanitization, decontamination, and therapeutic devices, systems, and methods." U.S. Patent 11,253,620, issued February 22, 2022.

Golkowski, Mark, Jae-Do Park, Ronald AL Rorrer, and Zbigniew Celinski. "Magnetic shutter antenna." U.S. Patent 11,114,760, issued September 7, 2021.

PEER REVIEWED JOURNAL PUBLICATIONS

CU Denver student co-authors mentored by Dr. Golkowski are underlined

1) Ostrowski, **M., Gołkowski,** M., Kubisz, J., Nieckarz, Z., Michalec, A., Mlynarczyk, J., ... & Maxworth, A. (2024). Effects of a solar flare on global propagation of extremely low frequency waves. *Journal of Geophysical Research: Space Physics*, 129(12), e2024JA033083.

2) Hosseini, P., Harid, V., **Gołkowski, M.,** & Tu, W. (2024). Backward test particle simulation of nonlinear cyclotron wave-particle interactions in the radiation belts. *Frontiers in Astronomy and Space Sciences, 11*, 1484399.

3) Ostrowski, M., **Gołkowski, M.,** Kubisz, J., Michalec, A., Mlynarczyk, J., & Nieckarz, Z. (2024). Refraction of ELF electromagnetic waves by the ionospheric gradients at the day/night terminator measured at the Hylaty Station. *Journal of Geophysical Research: Space Physics,* 129(12), e2024JA033274.

4) Harid, V., Agapitov, O., Khatun-E-Zannat, R., **Gołkowski, M.,** & Hosseini, P. (2024). Complex Whistler-Mode Wave Features Created by a High Density Plasma Duct in the Magnetosphere. *Journal of Geophysical Research: Space Physics*, 129(3), e2023JA032047.

5) Kubisz, J., **Gołkowski, M.,** Mlynarczyk, J., Ostrowski, M., & Michalec, A. (2024). New method for determining azimuths of ELF signals associated with the global thunderstorm activity and the Hunga Tonga volcano eruption. *Journal of Geophysical Research: Atmospheres*, 129(4), e2023JD040318.

6) Pailoor, N., Cohen, M., Richardson, D., Harid, V., & **Gołkowski, M.** (2023). Quantification of lightning-induced electron precipitation events on electron fluxes in the radiation belts. *Journal of Geophysical Research: Space Physics*, 128(9), e2022JA031153.

7) Sahai, A. A., **Golkowski, M.,** Gedney, S., Katsouleas, T., Andonian, G., White, G., Stohr, J., Muggli, P., Filippetto, D., Zimmermann, F. and Tajima, T.. (2023). PetaVolts per meter Plasmonics: introducing extreme nanoscience as a route towards scientific frontiers. *Journal of Instrumentation*, 18(07), P07019.

8) Said, R., **Gołkowski, M.,** & Harid, V. (2023). Empirical Parameterization of Broadband VLF Attenuation in the Earth-Ionosphere Waveguide. *Journal of Geophysical Research: Space Physics*, 128(4), e2022JA030742.

9) Janssens, K., Ball, M., Schofield, R.M., Christensen, N., Frey, R., Van Remortel, N., Banagiri, S., Coughlin, M.W., Effler, A., **Gołkowski, M.** and Kubisz, J. (2023). Correlated 1–1000 Hz magnetic field fluctuations from lightning over Earth-scale distances and their impact on gravitational wave searches. *Physical Review D*, 107(2), 022004.

10) Sahai, A. A., **Golkowski, M.,** Katsouleas, T., Andonian, G., White, G., Joshi, C., Taborek, P., Harid, V. and Stohr, J. (2022). Approaching Petavolts per meter plasmonics using structured semiconductors. *IEEE Access*, 11, 476-493.

11) Harid, V., **Gołkowski, M**., Hosseini, P., & Kim, H. (2022). Backward-propagating source as a component of rising tone whistler-mode chorus generation. *Frontiers in Astronomy and Space Sciences*, 9, 981949.

12) Bernhardt, P.A., Hua, M., Bortnik, J., Ma, Q., Verronen, P.T., McCarthy, M.P., Hampton, D.L., **Golkowski, M**., Cohen, M.B., Richardson, D.K. and Howarth, A.D., (2022). Active Precipitation of Radiation Belt Electrons Using Rocket Exhaust Driven Amplification (REDA) of Man-Made Whistlers. *Journal of Geophysical Research: Space Physics*, 127(6), e2022JA030358.

13) Kim, H. Y., **Gołkowski, M.,** & Harid, V. (2022). Trapped Electron Effects in Transient Helium Sub-Nanosecond Atmospheric Microplasmas. *IEEE Transactions on Plasma Science.*

14) Parrot, M., Němec, F., Cohen, M. B., & **Gołkowski, M.** (2022). On the use of ELF/VLF emissions triggered by HAARP to simulate PLHR and to study associated MLR events. *Earth, Planets and Space*, 74(1), 1-23.

15) Harid, V., Liu, C., Pang, Y., Alvina, A. J., **Golkowski, M.,** Hosseini, P., & Cohen, M. (2021). Automated Large-Scale Extraction of Whistlers Using Mask-Scoring Regional Convolutional Neural Network. *Geophysical Research Letters*, 48(15), e2021GL093819.

16) Slevin, E., Cohen, M. B., Opalinski, N., Thompson, L., & **Golkowski, M.** (2021). Broadband Electrically-Small VLF/LF Transmitter via Time-Varying Antenna Properties. *IEEE Transactions on Antennas and Propagation*.

17) Kim, H. Y., **Gołkowski, M**., & Harid, V. (2021). Rapid ionization of Xe/Ar mixtures in nanosecond discharges exploiting post-pulse field reversals. *Plasma Research Express*, 3(2), 025003.

18) Bernhardt, P. A., Bougas, W. C., Griffin, M. K., Watson, C., Langley, R. B., Howarth, A. D., ... & **Gołkowski, M**. (2021). Strong amplification of ELF/VLF signals in space using neutral gas injections from a satellite rocket engine. *Radio Science*, 56(2), e2020RS007207.

19) Hosseini, P., Agapitov, O., Harid, V., & **Gołkowski, M**. (2021). Evidence of Small Scale Plasma Irregularity Effects on Whistler Mode Chorus Propagation. *Geophysical Research Letters*, 48(5), e2021GL092850.

20) **Golkowski, M**., C. Renick, M. B. Cohen, (2021) Quantification of Ionospheric Perturbations from Lightning using Overlapping Paths of VLF Signal Propagation, *Journal of Geophysical Research: Space Physics* 126(5), e2020JA028540.

21) Kim, H. Y., Harid, V., Mroz, A., Wewerka, J., Todorovski, D. J., **Gołkowski, M.,** & Opalinski, N. M. (2020). Imaging Conductive Objects Through Metal Enclosures Using ELF/VLF Magnetic Fields. *IEEE Access*, 8, 79745-79753.

22) Maxworth, A. S., **Gołkowski, M.,** Malaspina, D. M., & Jaynes, A. N. (2020). Raytracing Study of Source Regions of Whistler Mode Wave Power Distribution Relative to the Plasmapause. *Journal of Geophysical Research: Space Physics*, 125(4), e2019JA027154.

23) Maxworth, A., Hussey, G., & **Gołkowski, M.** (2020). Coexistence of Lightning Generated Whistlers, Hiss and Lower Hybrid Noise Observed by e-POP (SWARM-E)–RRI. *Atmosphere*, 11(2), 177.

24) Harid, V., **Gołkowski, M**., Gedney, S. D., Cohen, M. B., Patch, S. K., Rorrer, R. A., ... & Kim, H. Y. (2019). Magnetic field penetration into a metal enclosure using an ELF/VLF loop antenna. *IEEE Transactions on Electromagnetic Compatibility*.

25) **Gołkowski, M**., Harid, V.and Hosseini, P., (2019) Review of Controlled Excitation of Nonlinear Wave-Particle Interactions in the Magnetosphere, *Frontiers Astronomy and Space Science*. doi: 10.3389/fspas.2019.00002

26) Hosseini, P., **Gołkowski, M**., & Harid, V. (2019). Remote sensing of Radiation Belt energetic electrons using lightning triggered upper band chorus. *Geophysical Research Letters*, 46. https://doi.org/10.1029/2018GL081391.

27) **Golkowski, M.** S. Sarker, C. Renick, R. C. Moore, M. B. Cohen, A. Kułak, J. Młynarczyk, J. Kubisz (2018) Ionospheric D-region Remote Sensing Using ELF Sferic Group Velocity, *Geophysical Research Letters.,* 45, 12,739–12,748, https://doi.org/10.1029/2018GL080108

28) **Golkowski, M.** and A. S. Maxworth (2018), Whistler Mode Wave Refractive Index in a Finite Temperature Anisotropic Plasma Medium, *Applied Computational Electromagnetics Society Journal, 33*, 10, 1076-1080, DOI: 10.23919/ROPACES.2018.8364235

29) Kim, H., **M. Golkowski**, (2018) Optimal waveforms for capacitively coupled ionization in nanosecond plasma discharges. *Plasma Sources Science and Technology*, 27(10), 105015.

30) Cohen, M. B., N. C. Gross, M. A. Higginson-Rollins, R. A. Marshall, **M. Gołkowski** , W. Liles, D. Rodrigues and J. Rockway (2018) The Lower Ionospheric VLF/LF Response to the 2017 Great American Solar Eclipse Observed Across the Continent. *Geophysical Research Letters*, *45*(8), 3348-3355 doi:10.1002/2018GL077351.

31) Hosseini, P., **M. Gołkowski**, H. T. Chorsi, S. D. Gedney, and R. C. Moore (2018) Using Eccentricity to Locate Ionospheric Exit Points of Magnetospheric Whistler Mode Waves. *IEEE Transaction on Geoscience and Remote Sensing*, 56, 12, 7049 – 7061, doi: 10.1109/TGRS.2018.2847605

32) M. W. Coughlin, A. Cirone, P. Meyers, S. Atsuta, V. Boschi, A. Chincarini, N. L. Christensen, R. De Rosa, A. Effler, I. Fiori, **M. Golkowski,** et al (2018), Measurement and subtraction of Schumann resonances at gravitational-wave interferometers, *Physical Review D* 97.10 (2018): 102007, doi:10.1103/PhysRevD.97.102007

33) Kim, H., **M. Golkowski**, C. Golkowski, P. Stoltz, M.B. Cohen, M. Walker (2018) PIC simulations of post-pulse field reversal and secondary ionization in nanosecond Argon discharges. *Plasma Sources Science and Technology*, 27(5), 055011 doi: 10.1088/1361-6595/aac0e5

34) Gross, N. C., M. B. Cohen, R. K. Said, and **M. Gołkowski** (2018) Polarization of narrowband VLF transmitter signals as an ionospheric diagnostic. *J. Geophys. Res.: Space Physics 123,* 901–917, doi: 10.1002/2017JA024907.

35) Costabile, J. D., **M. Gołkowski,** and R. E. Wall (2017). Modulation analysis of whistler mode sidebands in VLF-triggered emissions and implications for conditions of nonlinear growth. *J. Geophys. Res.: Space Physics, 122*, 12,505–12,516. doi:10.1002/2017JA024501

36) **Gołkowski, M.,** & Gibby, A. R. (2017). On the conditions for nonlinear growth in magnetospheric chorus and triggered emissions. *Physics of Plasmas, 24(9),* 092904, doi.org/10.1063/1.4986225

37) Maxworth, A. S., and **M. Gołkowski** (2017), Magnetospheric whistler mode ray tracing in a warm background plasma with finite electron and ion temperature, *J. Geophys. Res. Space Physics, 122*, 7323–7335, doi:10.1002/2016JA023546.

38) Hosseini, P., **M. Gołkowski**, and D. L. Turner (2017), Unique concurrent observations of whistler mode hiss, chorus, and triggered emissions, *J. Geophys. Res. Space Physics, 122*, 6271–6282, doi:10.1002/2017JA024072.

39) Kowalska-Leszczynska, I., Bizouard, M. A., Bulik, T., Christensen, N., Coughlin, M., **Gołkowski, M**., M., Kubisz, J., Kulak, A., Mlynarczyk, J., Robinet, F. and Rohde, M. (2017). Globally coherent short duration magnetic field transients and their effect on ground based gravitational-wave detectors. *Classical and Quantum Gravity*, 34(7), 074002.

40) Coughlin, M. W., Christensen, N. L., De Rosa, R., Fiori, I., **Gołkowski**, **M.,** Guidry, M., M., Harms, J., Kubisz, J., Kulak, A., Mlynarczyk, J. and Paoletti, F.,(2016). Subtraction of correlated noise in global networks of gravitational-wave interferometers. *Classical and Quantum Gravity*, *33*(22), 224003.

41) **Golkowski, M.,** Leszczynski, J., Plimpton, S. R., McCollister, B., & Golkowski, C. (2015). In Vitro and In Vivo Analysis of Hydrogen Peroxide-Enhanced Plasma-Induced Effluent for Infection and Contamination Mitigation at Research and Medical Facilities. *Plasma Medicine*, *5*(2-4).

42) Morrison, K. A. O. Asanbe, X. Dong,1 A. L. Weinstein, Y. Toyoda, D. Guevara, E. Kirkels, W. Landford, Cz. Golkowski, **M**. **Golkowski** and J. A. Spector (2015), **Rapid** Sterilization of Cell Phones Using a Novel Portable Non-Thermal Plasma Device *Plasma Medicine*, 5(1): 57–70.

43) Maxworth, A. S., **M. Gołkowski**, M. B. Cohen, R. C. Moore, H. T. Chorsi, S. D. Gedney, and R. Jacobs (2015), Multistation observations of the azimuth, polarization, and frequency dependence of ELF/VLF waves generated by electrojet modulation, *Radio Sci.,* 50*, doi:*10.1002/2015RS005683.

44) Watanabe, N., **M. Gołkowski,** J. P. Sheerin, B. J. Watkins (2015), Simultaneous Multi-angle Observations of Strong Langmuir Turbulence at HAARP, *Earth, Moon, Planets,* , doi:10.1007/s11038-015-9471-0.

45) Radenković, M. S., **M. Gołkowski** (2015), Distributed self-tuning consensus and synchronization, *Systems & Control Letters*, 76, 66-73, doi:10.1016/j.sysconle.2014.12.006.

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2) **M. Gołkowski**, A.S. Maxworth, (2018) Whistler mode wave numerical raytracing in a finite temperature anisotropic plasma medium, 2018 International Applied Computational Electromagnetics Society Symposium (ACES), doi: 10.23919/ROPACES.2018.8364235

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SELECT CONFERENCE PRESENTATIONS

1) **Golkowski, M**, Waves in Plasmas: *A 50-Year Quest for Resonance through Inhomogeneities, Anisotropies and Induced Perturbations - Commission H*,50th Anniversary **INVITED** Plenary Talk at the USNC-URSI National Radio Science Meeting, Boulder, CO 11 January, 2024.

2) **Golkowski, M**, The Search for Gamma Ray Burst Signatures in Extremely Low Frequency Magnetic Measurements, Oral Presentation at the XXXVth URSI General Assembly and Scientific Symposium, Sapporo, Japan, 25 August, 2023

3) **Golkowski, M**,P. Hosseini, V. Harid, O. Agapatiov *Modeling of Whistler Mode Propagation and Wave-Particle Interactions* **INVITED** Oral presentation at the VERSIM workshop, Kyoto, Japan (virtual meeting due to COVID19), 27 November 2020.

4) **Golkowski, M**,P. Hosseini, V. Harid, *Remote Sensing of Energetic Electron Anisotropy Using Lightning Triggered Upper Band Chorus*, Oral presentation at the American Geophysical Union Fall Meeting, Washington, DC, USA, 13 December 2018.

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