

Jacob Coty Stephens, Ph.D.

February 19, 2026

Texas Tech University
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CURRENT POSITION

Texas Tech University	Lubbock, TX
Associate Professor of Electrical and Computer Engineering	September 2024 – Present

EDUCATION

Massachusetts Institute of Technology	Post-Doctoral, EE/Phys.	2016-2018
Texas Tech University	PhD, Electrical Engineering	2015
Texas Tech University	MS, Electrical Engineering	2011
Texas Tech University	BS, Electrical Engineering	2011

CERTIFICATIONS

MIT – Kaufmann Teaching Program Certification	May 2018
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EXPERIENCE

Texas Tech University	
Associate Professor of Electrical and Computer Engineering	September 2024 – Present
Assistant Professor of Electrical and Computer Engineering	September 2019 – August 2024

Massachusetts Institute of Technology	
Staff Scientist	February 2018 – August 2019
Post-Doctoral Research Associate	February 2016 – January 2018

Sandia National Laboratories	
Graduate Research Associate	May 2013 – May 2015

Texas Tech University	
Graduate Research Assistant	August 2011 – January 2016

RESEARCH, AWARDS, AND AFFILIATIONS

Externally Funded Research

Lead PI on 13 externally funded awards
\$4.9M in credited research as lead PI or co-PI

Awards

2026 Chancellor's Council Distinguished Research Award	2026
2025 Chancellor's Council Distinguished Teaching Award	2025
FY24 Air Force Office of Scientific Research Young Investigator's Award	2023

Affiliations

LXCat Project Contributor
IEEE Member

May 2018 – Present
August 2009 – Present

SERVICE ACTIVITIES

Guest Editor

IEEE Transactions on Plasma Science

- 19th Special Issue on High-Power Microwave and Millimeter-Wave Generation
- IEEE Transactions on Plasma Science, Special Issue on the 50th Anniversary ICOPS Plenary, Invited, and Selected Minicourse Papers
- 2024 Special Issue on Pulsed Power

Conferences and Subcommittees

IEEE Pulsed Power Science and Technology Subcommittee	Elected Vice Chair – 2024 Elected member – 2022
Secretary – 2023 IEEE International Pulsed Power Conference	2023
Co-chair – LXCat Workshop on Ion Transport (<i>virtual</i>)	2023
LXCat Steering Committee	Elected Member – 2022

TEACHING AWARDS AND ACTIVITIES

- 3 graduated PhD students
- 12 graduated MS students
- Supervisor to 48 Capstone / Advanced Capstone students

Funded External Student Support Activities

<i>TTU – Scalable Asymmetric Lifecycle Engagement (SCALE)</i>	Role: Lead PI
(\$683k, \$140k/yr credited to Stephens)	Sponsor: Purdue / DoD May 2024 – Present
<i>Accelerator Science and Engineering Technology (ASET) Education - TTU</i>	Role: Co-PI
(\$125k/yr, \$31,250/yr credited to Stephens)	Sponsor: Los Alamos (LANL) September 2019 – Present

Teaching Awards

- 2025 Chancellor’s Council Distinguished Teaching Award February 2025
- Spring 2022 TTU-WCOE “Most Influential Faculty” Award May 2022
(student-selected awardee)
- Fall 2021 TTU-WCOE “Most Influential Faculty” Award December 2021
(student-selected awardee)

Awards of Supervised Students (external or internal to TTU)

Max Flynn (graduate)	James Clerk Maxwell Post- Doctoral Fellowship	External: Sandia National Laboratories	May 2024
Max Flynn (graduate)	Arthur Guenther International Pulsed Power Student Award	External: IEEE Pulsed Power Science and Technology Subcommittee	May 2024
Michael Mounho (graduate)	Graduate Recruitment Fellowship	Texas Tech Graduate School	September 2023

Travis Wright (graduate)	DEPS Graduate Student Fellowship	External: Directed Energy Professional Society	June 2023
Michael Mounho (graduate)	TTU-ECE MS Student of the Year Award	Texas Tech ECE Dept.	May 2023
Austin Hewitt (graduate)	NXP Graduate Fellowship	External: NXP Foundation	August 2022
Max Flynn (graduate)	NXP Graduate Fellowship	External: NXP Foundation	August 2022
Jacob Young (graduate)	Outstanding Thesis Award	Texas Tech Graduate School	June 2022
Grace Gomez (undergraduate)	Distinguished Graduated Student	Texas Tech ECE / TTU Graduate School	May 2022
Adrian Miller (undergraduate)	McAuley Distinguished Undergraduate Student	Texas Tech WCOE	May 2020

Course Instruction

Radio Frequency Laboratory	Undergraduate	F'19, S'21, F'21, S'22, F'23, S'24, F'25, S'26
Digital Communications Laboratory	Undergraduate	S'26
Electromagnetic Laboratory	Undergraduate (established new course)	F'23, S'24, F'25
Numerical Methods for Engineers and Scientists	Graduate (established new course)	F'20, F'22, F'24
Linear Signals and Systems	Undergraduate	S'20
Fundamentals of Elec. Eng.	Undergraduate	F'15

Student Feedback (selected examples)

- Fall 2020 “This class is exactly how numerical methods should be taught. Highly example centric and focused on learning through doing.”
- Spring 2021 “Dr. Stephens availability is unlike any other at Texas Tech. He is always willing to help and is very knowledgeable. Stephens Definitely one of the best professors I have had.”
- Fall 2021 “Dr. Stephens was one of the most knowledgeable professors I have had at Texas Tech.”
- Fall 2022 “Dr. Stephens class provides an in-depth insight into every current branch of Numerical Methods.”
- Spring 2023 “Tough but extremely knowledgeable and helpful I believe I am a better engineer and better prepared for the real world after this lab course”

PUBLICATIONS

Books / Book Chapters

1. J. Benford, E. Schamiloglu, J. Stephens, J. Swegle, P. Zhang “High Power Microwaves, 4th Edition” CRC Press (2025).
2. J.C. Stephens. Pulsed Power Architectures for Solid-State Devices. In: Bayne, S.B., Pushpakaran, B.N. (eds) Power Semiconductor Technology in Pulsed Power Applications. Springer, Cham. (2025).

Selected peer-reviewed journal articles

- **J. Stephens**, J. Mankowski, J. Dickens, A. Neuber, J. Schrock, B. Hoff, S. Heidger, “Traveling Wave Pulse Compression via a Lumped Element Nonlinear Transmission Line”, (*submitted for publication, 2026*).
 - A. Slovak, M. Flynn, A. Steiner, A. Neuber, **J. Stephens** “Low-Probability Analysis for Sub-Paschen Level Discharge in Self-breakdown Pressurized Spark Gap” (*in preparation*).
 - W. Hendricks, A.T. Hewitt, J. Dickens, A. Neuber, J. Mankowski, **J. Stephens** “Experimental Study Small Scale Coaxial Gyromagnetic Nonlinear Transmission Lines” (*accepted for publication, IEEE Transactions on Plasma Science, 2026*)
- 1) B. Esser, **J.C. Stephens**, J.C. Dickens, A.A. Neuber, J.J. Mankowski, C.A. Chapin, Q. Shao, D.O. Smith, L.F. Voss, J.A. Schrock, B. Hoff, S. Heidger “Testing of Novel Semiconductor Opening Switches Using Magnetic Switching” *IEEE Trans. Plasma Sci.*
 - 2) H. Spencer, M. Rawson, J. Dickens, A. Neuber, **J. Stephens**, J. Mankowski, J. Schrock, B. Hoff, S. Heidger, “Behavioral model of a semiconductor opening switch (SOS)” *AIP Advances*, **15**, 075323 (2025).
 - 3) K. Kelp, D. Wright, J. Stephens, J. Dickens, J. Mankowski, Z. Shaw, A. Neuber “Modeling Pulsed Magnetic Core Behavior in LTspice” *Electronics* **14**, 2335 (2025).
 - 4) D. Wright, K. Kelp, T. Klein, **J. Stephens**, J. Dickens, J. Mankowski, Z.C. Shaw, A. Neuber, “Assessing nanocrystalline pulsed transformer core performance using Maxwell ANSYS” *AIP Advances* **15**, 065323 (2025).
 - 5) J. Mockert, Z. Cardenas, B. Esser, **J.C. Stephens**, J.C. Dickens, J.J. Mankowski, D. Friesen, D. Hattz, C. Nelson, A.A. Neuber, “Humidity-Dependent Electrostatic Charge Decay on Dielectric Surface in Enclosed Volumes”, *IEEE Trans. Dielec. Elect. Insul.* **33**, pp. 107-114, (2025).
 - 6) **J. Stephens**, T. Wright, D. Saheb, L. Silvestre, W. Hendricks, N. Black, J. Mankowski, J. Dickens, A. Neuber, E. Schrock, J. Schrock “Experimental Characterization of a Genetic Algorithm-Optimized Nonlinear Transmission Line” *IEEE Trans. Micro. Th. Techniq.* **73**, pp. 1791-1798, 10.1109/TMTT.2024.3457311 (2024).
 - 7) M. Mounho, C. Fuksa, R. Clark, W. Brooks, A. Steiner, M. Hopkins, A. Neuber, **J. Stephens**, “Characterization of statistical flashover probability in novel vacuum insulator geometries” *Phys. Plasmas* **31**, 080701 (2024).
 - 8) T. Wright, D. Saheb, J. Hoebelheinrich, J. Mankowski, J. Dickens, A. Neuber, E. Schrock, J. Schrock, **J. Stephens** “Characterization of Solid-State Nonlinear Transmission Line PCB for RF Production” *IEEE Trans. Plasma Sci.* **52**, pp. 2854-2860, (2024).
 - 9) M. Flynn, L. Vialetto, A. Fierro, A. Neuber, **J. Stephens**, “Benchmark calculations for anisotropic scattering in kinetic models for low temperature plasma” *J. Phys. D: Appl. Phys.* **57**, 255204 (2024).
 - 10) R. Clark, M. Mounho, W. Brooks, M. Hopkins, **J. Stephens**, A. Neuber, “Spectroscopic investigation of early light emission from anode-initiated surface flashover in vacuum” *Phys. Plasmas* **31**, 032112 (2024).
 - 11) L. Silvestre, J. Matthies, L. Boswell, **J. Stephens**, J. Dickens, A. Young, A. Neuber, “Nanosecond Breakdown Characteristics of C₄F₇N and Various Mixtures at Pressures Above 1 Atmosphere in Comparison with SF₆” *Appl. Sci.* **14**, 11268, (2024).

- 12) N. Fryar, K. Schriener, **J. Stephens**, J. Dickens, A. Young, A. Neuber “Benchmarking the Suitability of Novec TM 4710 for Application in Flux Compression Generators” *IEEE Trans. Plasma Sci.* pp. 1-6 (2024).
- 13) B. Esser, Z. Cardenas, J.T. Mockert, **J.C. Stephens**, J.C. Dickens, J.J. Mankowski, A.A. Neuber, D. Friesen, D. Hattz, C. Nelson “Effect of Approach Speed and Electrode Geometry on Electrostatic Discharges Off Floating Dielectrics” *IEEE Trans. Plasma Sci.* pp. 1-8, (2024).
- 14) N. Fryar, **J. Stephens**, J. Mankowski, J. Dickens, D. Hattz, N. Koone, A. Neuber “Evaluating the impact of air terminal geometry on lightning intercept efficacy under a strong background electric field” *AIP Adv.* **14**, 045235 (2024).
- 15) H. Spencer, D. Wright, A. Gregory, J. Mankowski, **J. Stephens**, J. Dickens, A. Neuber “Evaluation of methods to counteract multipactor phenomena in X-band waveguides” *Phys. Plasmas* **31**, 032108 (2024).
- 16) K. Schriener, N. Fryer, T. Watson, **J. Stephens**, J. Dickens, A. Young, A. Neuber “Impact of mechanical tolerances on partial turn skipping in helical flux compression generator” *AIP Adv.*, **14**, 115016, (2024).
- 17) A. Fierro, A. Alibalazadeh, J. Stephens, C. Moore “Massively parallel axisymmetric fluid model for streamer discharges” *Comp. Phys. Comm.* (accepted, in press).
- 18) M. Flynn, J. Agan, A. Neuber, **J. Stephens** “Generation and optimization of cross-sections for electron-C4F7N collisions” *J. Phys. D: Appl. Phys.*, **56**, 485207 (2023).
- 19) A. Gregory, D. Wright, H. Spencer, J.J. Mankowski, J.C. Dickens, J. Stephens, A.A. Neuber “An apparatus for probing multipactor in X-band waveguide components” *Rev. Sci. Instrum.* **94**, 054705 (2023).
- 20) L. Silvestre, **J. Stephens**, J. Dickens, J. Mankowski, A. Neuber, R.P. Joshi “A 1D1V Continuum Vlasov-Poisson Multipactor Analysis from Onset to Saturation Across the Entire First-Order Multipactor Regime”, *IEEE Trans. Plasma Sci.* **51**, 483-492 (2023).
- 21) Yan, K., Jie, X., Li, X., Horita, J., **Stephens, J.**, Hu, J. and Yuan, Q., “Microwave-enhanced methane cracking for clean hydrogen production in shale rocks” *International Journal of Hydrogen Energy*, **48**, pp.15421-15432 (2023).
- 22) (Open Access) A.T. Hewitt, B. Esser, R.P. Joshi, J. Mankowski, J. Dickens, A. Neuber, R. Lee, **J. Stephens**, “Optically Activated In-Waveguide Semiconductor Attenuators for the Controllable Isolation of Ka-band Microwaves” *IEEE Trans. Microwave Theory and Techniques*, **70**, pp. 2217-2223 (2022).
- 23) W. Brooks, R. Clark, J. Young, M. Hopkins, J. Dickens, **J. Stephens**, A. Neuber, “Exploring the Basic Physical Mechanisms of Cathode-and-Anode-Initial High-Voltage Surface Flashover” *IEEE Trans. Plasma Sci.* **50**, pp.3361-3370 (2022).
- 24) D. Wright, Z.C. Shaw, J.J. Mankowski, J.C. Dickens, **J. Stephens**, A.A. Neuber, “Multipactor suppression via asymmetric grooves in S-band waveguide” *Phys. Plasmas*, **29**, 063108 (2022).
- 25) M. Flynn, A. Neuber, **J. Stephens**, “Benchmarking the calculation of electrically insulating properties of complex gas mixtures using a multi-term Boltzmann equation model” *J. Phys. D: Appl. Phys.* **55**, 015201, (2022).
- 26) M. Tahiyat, **J. Stephens**, V. Kolobov, T. Farouk, “Striations in moderate pressure dc driven nitrogen glow discharge” *J. Phys. D: Appl. Phys.* **55**, 085201 (2022).

- 27) Carbone, E.; Graef, W.; Hagelaar, G.; Boer, D.; Hopkins, M.M.; **Stephens, J.C.**; T. Yee, B.; Pancheshnyi, S.; van Dijk, J.; Pitchford, L.; “Data Needs for Modeling Low-Temperature Non-Equilibrium Plasmas: The LXCat Project, History, Perspectives and a Tutorial” *Atoms* **9**, (2021).
- 28) **J. C. Stephens**, G. Rosenzweig, M. A. Shapiro, R. J. Temkin, J. C. Tucek, and K. E. Kreischer, “Subterahertz Photonic Crystal Klystron Amplifier”, *Phys. Rev. Lett.* **123**, 244801 (2019).
- 29) J.F. Picard, S.C. Schaub, G. Rosenzweig, **J.C. Stephens**, M.A. Shapiro, R.J. Temkin, “Laser-Driven Semiconductor Switch for Generating Nanosecond Pulses from a Megawatt Gyrotron”, *Appl. Phys. Lett.* **114**, 164102 (2019).
- 30) **J. Stephens**, “A Multi-Term, Multi-Harmonic Boltzmann Equation Model for Kinetic Behavior in Intense Microwave and Terahertz Excited Low Temperature Plasmas”, *Phys. Plasmas*, **25**, 103502 (2018).
- 31) **J. Stephens**, “A Multi-Term Boltzmann Equation Benchmark of Electron-Argon Cross-Sections in Low Temperature Plasma Environments”, *J. Phys. D: Appl. Phys.* **51**, 125203 (2018).
- 32) X. Lu, **J.C. Stephens**, I. Mastovsky, M.A. Shapiro, R.J. Temkin, “High Power Long Pulse Microwave Generation from a Metamaterial Structure with Reverse Symmetry”, *Phys. Plasmas*, **25**, 023102 (2018).
- 33) A.V. Soane, M.A. Shapiro, **J. Stephens**, R.J. Temkin “Theory of Linear and Nonlinear Gain in a Gyroamplifier Using a Confocal Waveguide” *IEEE Trans. Plasma Sci.*, **45**, 2438, (2017).
- 34) **J. Stephens**, A. Fierro, S. Beeson, G. Laity, D. Trienekens, R.P. Joshi, J. Dickens, A. Neuber, “Photoionization capable, extreme and vacuum ultraviolet emission in developing low temperature plasmas in air”, *Plasma Sources Sci. Technol.* **25**, 025024 (2016).
- 35) **J. Stephens**, A. Fierro, D. Trienekens, J. Dickens, A. Neuber, “Optimizing drive parameters of a 121.6 nm source”, *Plasma Sources Sci. Technol.* **24**, 015013 (2015).
- 36) **J. Stephens**, A. Fierro, B. Walls, J. Dickens, A. Neuber, “Nanosecond, repetitively pulsed microdischarge vacuum ultraviolet source” *Appl. Phys. Lett.* **104**, 074105 (2014).
- 37) **J. Stephens**, A. Fierro, J. Dickens, A. Neuber, “Influence of VUV illumination on breakdown mechanics: pre-ionization, direct photoionization, and discharge initiation” *J. Phys. D: Appl. Phys.* **47**, 325501 (2014).
- 38) **J. Stephens**, J. Dickens, A. Neuber, “Semiempirical wide-range conductivity model with exploding wire verification”, *Phys. Rev. E.* **89**, 053102 (2014).
- 39) **J. Stephens**, A. Fierro, J. Dickens, A. Neuber, “Micrometer-resolution high speed imaging of pulsed microdischarge ignition”, *IEEE Trans. Plasma Sci.* **42**, 2652 (2014).
- 40) **J. Stephens**, A. Neuber, “Exploding Wire Experiments and Theory for Metal Conductivity Evaluation in the Sub-eV Regime”, *Phys. Rev. E* **86**, 066409 (2012).

Selected archived conferences proceedings (selected)

- 41) D. Saheb, T. Wright, J. Mankowski, J. Dickens, A. Neuber, **J. Stephens**, J. Schrock, E. Schrock “A Comparison of Various Solid-State Pulse Generators for Small-Scale Nonlinear Transmission Line Applications” *Proceedings of the International Power Modulator and High Voltage Conference*, 2024.

- 42) T. Wright, D. Saheb, J. Mankowski, J. Dickens, A. Neuber, **J. Stephens**, J. Schrock, E. Schrock “Experimental Study of the Upper Frequency Limits of a PCB-based Nonlinear Transmission Line” Proceedings of the International Power Modulator and High Voltage Conference, 2024.
- 43) W. Hendricks, **J. Stephens**, A. Neuber, J. Mankowski, J. Dickens “Experimental Characterization of Distributed Ferromagnetic Nonlinear Transmission Lines in Different Geometries” Proceedings of the International Power Modulator and High Voltage Conference, 2024.
- 44) L. Silvestre, J. Matthies, **J. Stephens**, J. Mankowski, J. Dickens, A. Neuber, A. Young, “Spark Gap Impedance Collapse and Current Rise Times in Modern Insulating Gas Mixtures” Proceedings of the International Power Modulator and High Voltage Conference, 2024.
- 45) M. Mounho, R. Clark, W. Brooks, M. Hopkins, A. Neuber, **J. Stephens** “Statistical characterization of anode-initiated vacuum surface flashover” Proceedings of the 2023 IEEE Pulsed Power Conference.
- 46) M. Flynn, J. Agan, A. Neuber, **J. Stephens** “Evolution Towards a Complete Set of C4F7N Cross-Sections” PPC 2023 Proceedings of the 2023 IEEE Pulsed Power Conference.
- 47) J. Slattery, B. Bywater, A.T. Hewitt, J. Mankowski, J. Dickens, A. Neuber, D. Freisen, D. Hattz, N. Koone, C. Nelson, **J. Stephens** “Experiments to Quantify the Shielding Efficacy of Materials to be Implemented for Portable Shielding Enclosures that Adequately Mitigate EMI from Lighting Attachment Events” Proceedings of the 2023 IEEE Pulsed Power Conference.
- 48) D. Saheb, T. Wright, J. Mankowski, J. Dickens, A. Neuber, J. Schrock, **J. Stephens** “Experimental demonstration of a compact, high average power, pulsed power driver for printed-circuit board nonlinear transmission lines” Proceedings of the 2023 IEEE Pulsed Power Conference.
- 49) Yan, K., Yuan, Q., Jie, X., Li, X., Horita, J. and **Stephens, J.**, “Microwave-Assisted Catalytic Heating for Enhanced Clean Hydrogen Generation from Methane Cracking in Shale Rocks” In SPE Annual Technical Conference and Exhibition. OnePetro (2022).

Invited Talks

- 1) **INVITED** – Authored invited oral presentation for the 2nd Workshop on Swarm Physics and Gaseous Dielectrics
J. Stephens, M. Flynn, A. Neuber, “Multi-term Boltzmann Models: Engineering Tools for the Pulsed Power Community” 2nd Workshop on Swarm Physics and Gaseous Dielectrics, Belgrade, Serbia, 2024.
- 2) **INVITED** – Authored invited oral presentation for the 2020 IEEE International Vacuum Electronics Conference
J. Stephens, G. Rosenzweig, J. Tucek, K. Kreischer, M. Shapiro, R. Temkin, “Experimental demonstration of a W-band photonic bandgap klystron” 2020 IEEE Vacuum Electronics Conference, October 19-22, 2020 (Virtual format).
- 3) **INVITED** – Authored invited oral presentation for the 2019 IEEE Pulsed Power and Plasma Science Conference
Jacob Stephens, Guy Rosenzweig, John Tucek, Mark Basten, Kenneth Kreischer, Michael Shapiro, Richard Temkin, “Experimental Characterization of a W-band Photonic Interaction Klystron”, 2019 IEEE

Pulsed Power and Plasma Science Conference, Jun. 23-28, 2019, Orlando, FL, USA

- 4) **INVITED** – Oral presentation at the 2015 IEEE International Pulsed Power Conference
J. Stephens, A. Fierro, S. Beeson, J. Dickens, A. Neuber, “Experimental Observation of Photoionization Relevant Emission from Developing Low Temperature Plasmas in Air”, Proc. of the 2015 IEEE Pulsed Power Conference, May 31 – June 4, 2015 in Austin, TX, USA