Álvaro Romero-Calvo, Ph.D.

Assistant Professor (tenure-track), Director of the Low-Gravity Science and Technology Laboratory
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Education

May 2022 — Ph.D., "Novel Electromagnetic Space Applications: Electron-Based Touchless Potential Sensing & Low-Gravity Magnetohydrodynamics", Aerospace Engineering, University of Colorado Boulder (Advisor: Dr. H. Schaub)

August 2019 — M.Sc., "Sloshing of magnetic liquids under low-gravity conditions", Aeronautical & Space Engineering, Universidad de Sevilla / Politecnico di Milano (Advisor: Dr. F. Maggi)

August 2016 — B.Sc., "Development and testing of a quantitative heat flux estimation method for geographical surfaces. Application to the Urban Heat Island Effect", Aerospace Engineering, Universidad de Sevilla (Advisor: Dr. A.M. Gañán-Calvo)

Work Experience

8/2022 – Present — **Georgia Institute of Technology**, School of Aerospace Engineering, Atlanta, Georgia
Assistant Professor (tenure-track)

8/2019 – 7/2022 — **University of Colorado**, Aerospace Engineering Sciences Department, Boulder, Colorado
Graduate Research Assistant

8/2020 – 3/2022 — **NASA Jet Propulsion Laboratory**, Electrochemical Research, Technology, & Engineering Group, Pasadena, California
Visiting scholar (remote)

8/2016 – 2/2018 — **Lynzos SL**, Seville, Spain
Researcher & Developer

8/2015 – 8/2016 — **Universidad de Sevilla**, Seville, Spain
Spanish National Collaboration Grant - Internship

2/2016 – 5/2016 — **Airbus Defence & Space**, Simulators Maintenance and Operation Department, Seville, Spain
Airbus Seedbed Program - Internship

Projects and Grants

1/5/24– 1/10/25

Title: Thermoelectromagnetic SmallSat Propellant Positioning
PI: Álvaro Romero-Calvo
Sponsor: National Aeronautics and Space Administration
Research: NASA Flight Opportunities grant to demonstrate the positioning of saturated cold-gas propellants in CubeSat tanks.
Funds: $570,186
Romero-Calvo (PI) Funds: $536,704

1/2/24–
1/11/24

Title: MHD Drive for Hydrogen and Oxygen Production in Mars Transfer
PI: Álvaro Romero-Calvo
Sponsor: National Aeronautics and Space Administration
Research: NASA NIAC Phase I grant to assess the feasibility of a novel magnetohydrodynamic water electrolysis architecture.
Funds: $175,000
Romero-Calvo (PI) Funds: $110,654

1/8/23–
1/8/25

Title: ISS STEM Space Biological Sciences Experiments Program
PI: Dan Saldana
Sponsor: International Space Station National Lab
Research: Development of a 4U educational science payload for the ISS as part of a Georgia Tech aerospace senior design capstone course.
Funds: $100,000 + private funds + flight opportunity
Romero-Calvo (Collaborator) Funds: $10,000

1/8/23–
1/8/28

Title: The Center for Lunar Environment and Volatile Exploration Research
PI: Thomas Orlando
Sponsor: National Aeronautics and Space Administration
Research: CLEVER provides an integrated systems-level approach to characterizing and understanding the lunar environment and volatile inventories required for near-term human lunar exploration missions.
Funds: $5,000,000
Romero-Calvo (Co-I) Funds: $511,972

1/9/23–
31/4/24

Title: Self-Assembling Ferrofluid Ionic Liquid Mirror Telescope
PI: Neil Rowlands
Co-I: Álvaro Romero-Calvo (GT PI), David Stafford
Sponsor: Honeywell Aerospace (DARPA Prime)
Research: Modeling and simulation of free ferrofluid interface subject to a Halbach array.
Funds: $2,050,000
Romero-Calvo (Co-I, GT PI) Funds: $350,000

15/2/23–
1/6/23

Title: Dielectrophoretic CubeSat Propellant Management
PI: Álvaro Romero-Calvo
Sponsor: Georgia Tech Center for Space Technology and Research
Research: Development of dielectrophoretic CubeSat propellant management system.
Funds: $5,000

1/9/23–
28/2/25

Title: Efficient Solar-Driven Oxygen and Fuel Production Utilizing Magnetically-Induced Buoyancy for Life Support During Long-Term Space Travel
PI: Katharina Brinkert
Co-I (GT PI): Álvaro Romero-Calvo
Sponsor: United Kingdom Space Agency
Research: Workforce support for ESA SolarMag project.
Funds: $257,768
Romero-Calvo Funds: $70,000 (workforce est.)

1/9/23–28/2/25

Title: Efficient Solar-Driven Oxygen and Fuel Production Utilizing Magnetically-Induced Buoyancy for Life Support During Long-Term Space Travel
PI: Katharina Brinkert
Co-I (GT PI): Álvaro Romero-Calvo
Sponsor: European Space Agency
Research: Design and testing of a magnetically-enhanced (photo-) electrolysis cell. ESA provides flight opportunity and hardware development.
Funds: $400,000 (hardware & flight opportunity est.)
Romero-Calvo Funds: $200,000 (hardware & flight opportunity est.)

1/1/23–1/12/23

Title: Hypersonic Magnetohydrodynamic Actuation for Entry, Descent, and Landing (EDL)
PI: Álvaro Romero-Calvo
Co-I: Cristina Riso, Joe Oefelein
Sponsor: Georgia Institute of Technology
Research: Augmentation of aerodynamic lift, drag, and reduction of heat loads during EDL using magnetohydrodynamic forces.
Funds: $32,250

1/1/23–5/1/23

Title: AE-4342 hardware kit development and implementation
PI: Álvaro Romero-Calvo
Sponsor: The Kern Entrepreneurial Engineering Network
Research: Implementation of spacecraft hardware testing into AE-4342 curriculum by including hardware testing.
Funds: $10,000

Honors and Awards

Nov. 2023	Thora Halstead Young Investigator Award 2023, American Society for Gravitational and Space Research
June 2023	Honorable Mention, International Contest of Ph.D. Theses in the Field of Magnetic Fluids, International Steering Committee on Magnetic Fluids
May 2023	Young Author's Award for Excellent Paper, 243 Electrochemical Society Meeting, Electrochemical/Materials Processing for Space Engineering
Nov. 2022	Outstanding Dissertation Award, College of Engineering, University of Colorado Boulder
May 2022	Smead Aerospace Engineering Sciences Department Graduate Award for Research
Jan. 2022	GMAG travel award for American Physical Society March Meeting 2022
Sept. 2021	Travel award for ASGSR 2021 Meeting
April 2021	*Rafael del Pino* Excellence Fellowship 2021
Oct. 2020	Finalist of IAF Luigi G. Napolitano Award 2020
April 2019	Smead Aerospace Engineering Sciences Department Excellence Award
April 2019	University of Colorado Boulder Engineering School Dean's Fellowship
July 2018	*La Caixa* Fellowship Award for Postgraduate Studies 2018
July 2018	Fulbright Fellowship for Postgraduate Studies (declined for practical reasons)
July 2018	Travel award for 42nd COSPAR Scientific Assembly
April 2018	ESA travel award for 2nd Symposium on Space Educational Activities
Jan. 2018	Student European Low-Gravity Research Association Member of the Month
March 2017	Erasmus+ Double Master's Degree Fellowship
April 2016	Best project of the Airbus Seedbed Program in Business Skills

Professional Service

Positions Held

Nov. 2023	ASGSR Board Member, Chair of Education Committee
May. 2023	Main Scientific Organizer (MSO) for COSPAR 2024 Assembly Session G0.5 GravityNEXT
Nov. 2022	ASGSR Board Member, Co-Chair of Education Committee
Aug. 2022	AIAA Microgravity and Space Processes Technical Committee
Jul. 2022	COSPAR Scientific Commission G - Vice Chair
Nov. 2021	ASGSR Student Chapter President
Nov. 2020	ASGSR Student Chapter President-Elect
Jan. 2018	SELGRA Expert in support of ESA *Drop Your Thesis!* 2018 Land3U team

External Reviewer Assignments

- AIAA Journal (1)
- AIAA Journal of Spacecraft and Rockets (2)
- Microgravity Science and Technology (3)
- Physics of Fluids (2)
- Acta Mechanica et Automatica (2)
- Journal of Applied and Computational Mechanics (2)
- Advances in Space Research (2)
- Journal of Magnetism and Magnetic Materials (2)
- The Journal of Space Safety Engineering (1)
- Micromachines (2)
- AIAA SciTech 2023 (7)
- AIAA SciTech 2024 (5)
- ASGSR Meeting 2022 (Education Chair & reviewer, 14 papers reviewed)
- ASGSR Meeting 2023 (Fluid Physics Co-Chair & reviewer, 18 papers reviewed)
- NASA Future Investigators in NASA Earth and Space Science and Technology (FINESST)
- NSF 2023 Graduate Research Fellowship Program

University Service

2023 – 2024	Georgia Tech Aerospace Engineering Chair Search Committee
2023 – 2024	Georgia Tech Aerospace Engineering Faculty Search Committee
2022 – 2024	Georgia Tech Aerospace Engineering Graduate Seminars Committee

Society Affiliations

2021 – 2023	Early-Career member of the American Physical Society (APS)
2020 – 2023	Full member of the American Society for Gravitational and Space Research (ASGSR)
2020 – 2023	Early-Career member of the American Institute of Aeronautics and Astronautics (AIAA)
2021 – 2022	Full member of the Cryogenic Society of America (CSA)
2016 – 2022	Full member of the European Low-Gravity Research Association (ELGRA)

Journal Articles

J1. A.M. Gañán-Calvo, K. Hnatkova, **Á. Romero-Calvo**, J. Fajardo-López, M. Malik, “Risk stratifiers for arrhythmic and non-arrhythmic mortality after acute myocardial infarction”, *Scientific Reports*, Vol. 8, pp. 9897, 2018.
doi:10.1038/s41598-018-28327-8

J2. **Á. Romero-Calvo**, G. Cano-Gómez, E. Castro-Hernández, F. Maggi, "Free and forced oscillations of magnetic liquids under low-gravity conditions", *Journal of Applied Mechanics*, Vol. 82, Num. 2, pp. 021010, 2020.
doi:10.1115/1.4045620

J3. **Á. Romero-Calvo**, G. Cano-Gómez, T. Hermans, L. Parrilla Benítez, M. Herrada, E. Castro-Hernández, "Total magnetic force on a ferrofluid droplet in microgravity", *Experimental Thermal and Fluid Science*, Vol. 117, pp. 110-124, 2020.
doi:10.1016/j.expthermflusci.2020.110124

J4. **Á. Romero-Calvo**, A. García-Salcedo, F. Garrone, I. Rivoalen, G. Cano-Gómez, E. Castro-Hernández, M. Herrada, F. Maggi, "StELIUM: A student experiment to investigate the sloshing of magnetic liquids in microgravity", *Acta Astronautica*, Vol. 173,pp. 344-355 2020.
doi:10.1016/j.actaastro.2020.04.013

J5. **Á. Romero-Calvo**, F. Maggi, H. Schaub, "Magnetic Positive Positioning: Toward the application in space propulsion", *Acta Astronautica*, Vol. 187, pp. 348-361, 2021.
doi:10.1016/j.actaastro.2021.06.045

J6. **Á. Romero-Calvo**, G. Cano-Gómez, T. Hermans, L. Parrilla Benítez, M. Herrada, E. Castro-Hernández, "Axisymmetric ferrofluid oscillations in a cylindrical tank in microgravity", *Microgravity Science and Technology*, Vol. 33, Num. 50, 2021.
doi:10.1007/s12217-021-09894-4

J7. **Á. Romero-Calvo**, A. García-Salcedo, F. Garrone, I. Rivoalen, G. Cano-Gómez, E. Castro-Hernández, F. Maggi, "Free surface reconstruction of opaque liquids in microgravity. Part 1: Design and on-ground testing", *Acta Astronautica*, Vol. 189, pp. 250–259, 2021.
doi:10.1016/j.actaastro.2021.08.029

J8. **Á. Romero-Calvo**, F. Garrone, A. García-Salcedo, I. Rivoalen, G. Cano-Gómez, E. Castro-Hernández, F. Maggi, "Free surface reconstruction of opaque liquids in microgravity. Part 2: Microgravity results", *Acta Astronautica*, Vol. 189, pp. 269-277, 2021.
doi:10.1016/j.actaastro.2021.07.020

J9. G. Cano-Gómez, **Á. Romero-Calvo** (*eq. contr. auth.*), "Comment on *The magnetic body force in ferrofluids*", *IOP Journal of Physics D: Applied Physics*, Vol. 55, pp. 128002, 2022.
doi:10.1088/1361-6463/ac4180

J10. **Á. Romero-Calvo**, G. Cano-Gómez, H. Schaub, "Diamagnetically enhanced electrolysis and phase separation in low-gravity", *Journal of Spacecraft and Rockets*, Vol. 59, No. 1, pp. 59-72, 2022.
doi:10.2514/1.A35021

J11. K. Wilson, **Á. Romero-Calvo**, M. Bengtson, J. Hammerl, J. Maxwell, H. Schaub, "Development and characterization of the ECLIPS space environments simulation facility", *Acta Astronautica*, Vol. 194, pp. 48-58, 2022.
doi:10.1016/j.actaastro.2021.12.037

J12. **Á. Romero-Calvo**, G. Cano-Gómez, H. Schaub, "Simulation and uncertainty quantification of electron beams in active spacecraft charging scenarios", *Journal of Spacecraft and Rockets*, Vol. 59, No. 3, pp. 739-750, 2022.
doi:10.2514/1.A35190

J13. **Á. Romero-Calvo**, A. García-Salcedo, F. Garrone, I. Rivoalen, F. Maggi, "Lateral and axisymmetric ferrofluid oscillations in a cylindrical tank in microgravity", *AIAA Journal*, Vol. 60, No. 4, pp. 2707-2712, 2022,
doi:10.2514/1.J061351

J14. K. Wilson, **Á. Romero-Calvo**, H. Schaub, "Constrained Guidance for Spacecraft Proximity Operations Under Electrostatic Perturbations", *Journal of Spacecraft and Rockets*, Vol. 59, No. 4, pp. 1304-1316, 2022,
doi:10.2514/1.A35162

J15. **Á. Romero-Calvo**, Hammerl J, H. Schaub, "Touchless potential sensing of differentially-charged spacecraft using secondary electrons", *Journal of Spacecraft and Rockets*, Vol. 59, No. 5, pp. 1623-1633, 2022,
doi:10.2514/1.A35355

J16. **Á. Romero-Calvo**, M. Herrada, G. Cano-Gómez, H. Schaub, "Fully Coupled Interface-Tracking Model for Axisymmetric Ferrohydrodynamic Flows", *Applied Mathematical Modelling*, Vol. 111, pp. pp. 836-861, 2022,
doi:10.1016/j.apm.2022.06.046

J17. **Á. Romero-Calvo**, A. Ömer, H. Schaub, and K. Brinkert. "Magnetic phase separation in microgravity", *npj Microgravity*, Vol. 8, No. 32, 2022,
doi:10.1038/s41526-022-00212-9

J18. **Á. Romero-Calvo**, V. Urbanskiy, V. Yudintsev, H. Schaub, V. Trushlyakov, "Novel propellant settling strategies for liquid rocket engine restart in microgravity", *Acta Astronautica*, Vol. 202, pp. 214-228, 2023,
doi:10.1016/j.actaastro.2022.10.012

J19. J. Hammerl, A. López, **Á. Romero-Calvo**, H. Schaub, "Touchless potential sensing of differentially-charged spacecraft using x-rays", *Journal of Spacecraft and Rockets*, Vol. 60, No. 2, pp. 648–658, 2023,
doi:10.2514/1.A35492

J20. **Á. Romero-Calvo**, K. Champion, H. Schaub, "Enabling Ultraviolet Lasers for Touchless Spacecraft Potential Sensing", *IEEE Transactions on Plasma Science*, Vol. 51, No. 9, pp. 2468-2481, 2023,
doi:10.1109/TPS.2023.3264914

J21. S. Hart, G. Lightsey, **Á. Romero-Calvo**, "Thermoelectromagnetic SmallSat Propellant Positioning", *Acta Astronautica*, Vol. 214, pp. 427-438, 2024,
doi:10.1016/j.actaastro.2023.11.007

J22. S. Hart, H. Malik, E. Sanchez, G. Lightsey, **Á. Romero-Calvo**, "Neutral Buoyancy Testing of Low-Gravity Fluid Management", *AIAA Journal*,
doi:10.2514/1.J063601

J23. Ö. Akay, M. Monfort-Castillo, S. Saravanabavan, **Á. Romero-Calvo***, and K. Brinkert*. "Efficient Water Electrolysis and Self-Sustaining Gas Bubble Management in Microgravity", *in preparation*

J24. E. Comstock, Hugh Chen, Tianyang Hu, **Á. Romero-Calvo***, and K. Brinkert*. "Spherical Magnetic Liquid Mirror Telescopes", *in preparation*

J25. **Á. Romero-Calvo**, C. Nogales, K. Billings, W. West, H. Schaub, "Design and testing of the microgravity Magnetically Enhanced Electrolysis (MEE) experiment", *in preparation*

Patents

P1. **Á. Romero-Calvo**, H. Schaub, "Systems and Methods for Magnetic Buoyancy Enhanced Electrolysis and Boiling Systems", US 2023/0265573 A1, August 2023.

P2. **Á. Romero-Calvo**, "Magnetohydrodynamic Drive for Gas Production in Microgravity", Preliminary Patent Application, Appl. No. 63/399784, August 22, 2022.

P3. **Á. Romero-Calvo**, S. Hart, G. Lightsey, "Systems and Methods for Satellite Positioning", US Application No. 63/483,138, February 3, 2023.

P4. **Á. Romero-Calvo**, "Magnetohydrodynamically Pumped Liquid Metal Loops for Spacecraft Thermal Control", US Application No. 63/504,558, May 2023.

Conference Papers and Proceedings

C1. **Á. Romero-Calvo**, T. Hermans, G. Cano-Gómez, L. Parrilla-Benítez, M. Herrada, E. Castro-Hernández, "Ferrofluid dynamics in microgravity conditions", In 2nd Symposium on Space Educational Activities, Budapest, Hungary, April 11-13, 2018

C2. A. Russo, F. Ventre, **Á. Romero-Calvo**, R. Cirelli, S. Andrea Bella, M. Lavagna, "Innovative sensor-based network for autonomous on-orbit structural health monitoring", In 70th International Astronautical Congress, Washington DC, US, October 21-25, 2019

C3. **Á. Romero-Calvo**, A. J. García-Salcedo, F. Garrone, I. Rivoalen, G. Cano-Gómez, E. Castro-Hernández, F. Maggi, "Free surface reconstruction of opaque liquids for experimental sloshing analyses in microgravity", In 70th International Astronautical Congress, Washington DC, US, October 21-25, 2019

C4. **Á. Romero-Calvo**, A. J. García-Salcedo, I. Rivoalen, F. Garrone, G. Cano-Gómez, E. Castro-Hernández, M. Herrada, F. Maggi, "Lateral sloshing of magnetic liquids in microgravity", In 70th International Astronautical Congress, Washington DC, US, October 21-25, 2019

C5. **Á. Romero-Calvo**, J. D. Biggs, F. Topputo, "Attitude control for the LUMIO CubeSat in deep space", In 70th International Astronautical Congress, Washington DC, US, October 21-25, 2019

C6. **Á. Romero-Calvo**, F. Maggi, H. Schaub, "Prospects and challenges for magnetic propellant positioning in low-gravity", In 43rd AAS Guidance, Navigation and Control Conference, Breckenridge, CO, US, January 30 - February 5, 2020

C7. **Á. Romero-Calvo**, M. Herrada, G. Cano-Gómez, H. Schaub, "Advanced numerical simulation of magnetic liquid sloshing in microgravity", In 71st International Astronautical Congress, Virtual, October 7-15, 2020

C8. K. Wilson, M. Bengtson, J. Maxwell, **Á. Romero-Calvo**, H. Schaub, "Characterization of the ECLIPS space environments simulation facility", In AIAA SciTech Forum and Exposition 2021, Virtual, January 21-22, 2021.
doi:10.2514/6.2021-1538

C9. **Á. Romero-Calvo**, G. Cano-Gómez, H. Schaub, "Electron beam expansion and deflection uncertainty for active spacecraft charging applications", In AIAA SciTech Forum and Exposition 2021, Virtual, January 21-22, 2021.
doi:10.2514/6.2021-1540

C10. J. Hammerl, **Á. Romero-Calvo**, A. López, H. Schaub, "Touchless potential sensing of complex differentially-charged shapes using x-rays", In AIAA SciTech Forum and Exposition 2022, San Diego, CA, US, January 3-7, 2022

C11. **Á. Romero-Calvo**, J. Hammerl, H. Schaub, "Touchless potential sensing of complex differentially-charged shapes using secondary electrons", In AIAA SciTech Forum and Exposition 2022, San Diego, CA, US, January 3-7, 2022

C12. **Á. Romero-Calvo**, V. Urbanskiy, V. Yudintsev, H. Schaub, V. Trushlyakov, "Microgravity restart of liquid rocket engine with low propellant residuals", In 44th AAS Guidance, Navigation and Control Conference, Breckenridge, CO, US, February 3-9, 2022

C13. **Á. Romero-Calvo**, K. Champion, H. Schaub, "Touchless spacecraft potential sensing using energetic electron beams and active photoemission", In 16th Spacecraft Charging Technology Conference, Virtual Event, April 4-9, 2022

C14. K Champion, **Á. Romero-Calvo**, H. Schaub, "Large scale particle tracing simulation for touchless potential sensing", In AIAA SciTech Forum and Exposition 2023, S. Gaylord National Harbor, MD, January 23–27, 2023

C15. **Á. Romero-Calvo**, S. Hart, G. Lightsey, "Novel Strategies for SmallSat Propellant Positioning", In AAS Guidance, Navigation and Control Conference, Breckenridge, CO, US, February 2-8, 2023

C16. M. Monfort-Castillo, **Á. Romero-Calvo**, "Magnetohydrodynamic Drive for Water-Based CubeSat Propulsion", In AIAA Region II Student Conference, Knoxville, TN, US, Mar. 27 – 28, 2023

C17. S. Hart, G. Lightsey, **Á. Romero-Calvo**, "Leveraging Phase Change for CubeSat Propellant Positioning", In AIAA SciTech Forum and Exposition 2024, Orlando, FL, US, January 8-12, 2024

C18. B. González, P. Martín, R. Shahid, E. Sánchez, J. Effendi, **Á. Romero-Calvo**, "Open-Source Propellant Sloshing Modeling and Simulation", In AAS Guidance, Navigation and Control Conference, Breckenridge, CO, US, February 1-7, 2024

C19. Neil Rowlands, **Alvaro Romero-Calvo**, David Stafford, Rebecca Kamire, Amanda Childers, Stephen F. Yates, Emir Rahislic, Sheng-Hai Zheng, Peter Cameron, Gabriel Cano-Gómez, Hugh Chen, Eric Comstock, Miguel Herrada, Tianyang Hu, "Development of a self-assembling ferrofluidic ionic liquid mirror", In SPIE Astronomical Telescopes + Instrumentation, June 16–21, 2024, *in preparation*

C20. Samuel Hart, Aaron Robinson, Conner Awald, **Álvaro Romero-Calvo**, "Magnetohydrodynamically Pumped Liquid Metal Loops for SmallSat Thermal Control", 53rd International Conference on Environmental Systems, July 21-25, 2024, *in preparation*

C21. Shay Vitale, Samuel Hart, **Álvaro Romero-Calvo**, " Dielectrophoretic Multiphase Flow Separation in Channel Geometries", 53rd International Conference on Environmental Systems, July 21-25, 2024, *in preparation*

C22. Macià Monfort-Castillo, **Álvaro Romero-Calvo**, "Magnetohydrodynamic Electrolytic Cell for Efficient Oxygen Generation in Microgravity", 53rd International Conference on Environmental Systems, July 21-25, 2024, *in preparation*

Conference Abstracts and Presentations

A1. **Á. Romero-Calvo**, T. Hermans, G. Cano-Gómez, L. Parrilla-Benítez, M. Herrada, E. Castro-Hernández, M. Herrada, F. Maggi, "Ferrofluid dynamics in microgravity conditions", 42nd COSPAR Scientific Assembly, Pasadena, California, US, July 14-22, 2018

A2. **Á. Romero-Calvo**, G. Cano-Gómez, E. Castro-Hernández, M. Herrada, F. Maggi, "Magnetic sloshing damping in microgravity", 8th Interplanetary CubeSat Workshop, Milan, Italy, May 28-29, 2019

A3. **Á. Romero-Calvo**, A. García-Salcedo, F. Garrone, I. Rivoalen, G. Cano-Gómez, E. Castro-Hernández, M. Herrada, F. Maggi, "Lateral sloshing of magnetic liquids in microgravity", 26th European Low Gravity Research Association Biennial Symposium and General Assembly, Granada, Spain, September 24-27, 2019

A4. **Á. Romero-Calvo**, "UNOOSA DropTES Programme - StELIUM", 27th Workshop on Space Technology for Socio-Economic Benefits: "Ensuring Inclusiveness through Space-based Applications and Space Exploration´´, Washington, DC, October 18-20, 2019

A5. **Á. Romero-Calvo**, H. Schaub, "Preliminary design of magnetically enhanced low-gravity electrolysis and phase separation system", ASGSR Meeting 2020, Virtual, November 5-6, 2020

A6. **Á. Romero-Calvo**, A. García-Salcedo, F. Garrone, F. Maggi, "Axisymmetric and lateral free surface oscillations of magnetic liquids in microgravity", 43rd COSPAR Scientific Assembly, Virtual, January 28 - Feburary 4, 2021

A7. **Á. Romero-Calvo**, M. Herrada, H. Schaub, "Axisymmetric bubble growth and detachment subject to inhomogeneous magnetic fields in microgravity", 43rd COSPAR Scientific Assembly, Virtual, January 28 - Feburary 4, 2021

A8. **Á. Romero-Calvo**, O. Akay, K. Brinkert, H. Schaub, "Magnetic enhancement of water electrolysis in reduced gravity environments", Lunar Surface Science Workshop: Fundamental and Applied Lunar Surface Research in Physical Sciences, Virtual, August 18-19, 2021

A9. **Á. Romero-Calvo**, H. Schaub, "Low-gravity magnetohydrodynamics: concept and applications", AIAA Annual Technical Symposium, University of Colorado Boulder, September 28, 2021

A10. **Á. Romero-Calvo**, K. Champion, H. Schaub, "Touchless potential sensing model for active spacecraft charging scenarios", Applied Space Environments Conference, Virtual, November 1-5, 2021

A11. **Á. Romero-Calvo**, C. Nogales, K. Billings, W. West, H. Schaub, "ASGSR Ken Souza program 2020: post-PDR design update", ASGSR Meeting 2021, Baltimore, MD, November 3-6, 2021

A12. F. París Carballo, "Actividades universitarias andaluzas en conexión con el sector espacio", Semana Mundial del Espacio, CTA-IDEA-CATEC, Seville, Spain, October 13, 2021

A13. **Á. Romero-Calvo**, M. Herrada, G. Cano-Gómez, H. Schaub, "Axisymmetric bubble growth and detachment subject to inhomogeneous magnetic fields in microgravity", APS March Meeting 2022, Chicalo, IL, US, March 14-17, 2022

A14. **Á. Romero-Calvo**, K. Champion, H. Schaub, "Touchless spacecraft potential sensing using energetic electron beams and active photoemission", 16th Spacecraft Charging Technology Conference, Virtual, April 4-8, 2022

A15. J. Hammerl, A. López, **Á. Romero-Calvo**, H. Schaub, "Measuring Multiple Potentials of a Rotating and Differentially-Charged Object Simultaneously Using X-rays", 16th Spacecraft Charging Technology Conference, Virtual, April 4-8, 2022

A16. **Á. Romero-Calvo**, M. Herrada, G. Cano-Gómez, H. Schaub, "Axisymmetric bubble growth and detachment subject to inhomogeneous magnetic fields in microgravity", APS March Meeting 2022, Chicalo, IL, US, March 14-17, 2022

A17. **Á. Romero-Calvo**, O. Akay, K. Brinkert, "Diamagnetic phase separation in microgravity", 44th COSPAR Scientific Assembly, Athens, Greece, July 16-24, 2022

A18. K. Brinkert, O. Akay, S. Saravanabavan, E. Sokalu, **Á. Romero-Calvo**, "Photoelectrochemical Hydrogen and Oxygen Production in Microgravity Environment", 44th COSPAR Scientific Assembly, Athens, Greece, July 16-24, 2022

A19. K. Brinkert, O. Akay, S. Saravanabavan, E. Sokalu, **Á. Romero-Calvo**, "Recent Advances in (Photo-)electrochemical Hydrogen and Oxygen Production for Space Exploration", 44th COSPAR Scientific Assembly, Athens, Greece, July 16-24, 2022

A20. K. Brinkert, **Á. Romero-Calvo**, O. Akay, "Efficient and Stable Hydrogen and Oxygen Production in Microgravity", 27th ELGRA Biennial Symposium & General Assembly, Lisbon, Portugal, September 6-9, 2022

A21. VIP Georgia Tech Drop Tower Challenge Team, "The GT Drop Tower: Our Pathway to Space", VIP Innovation Showcase, Georgia Institute of Technology, October 27, 2022

A22. K. Brinkert, **Á. Romero-Calvo**, O. Akay, "Efficient and Stable Hydrogen and Oxygen Production in Microgravity", ASGSR Meeting 2022, Houston, TX, November 9-12, 2022

A23. **Á. Romero-Calvo**, C. Nogales, K. Billings, W. West, H. Schaub, "Design and Results of the Magnetically Enhanced Electrolysis Experiment", ASGSR Meeting 2022, Houston, TX, November 9-12, 2022

A24. **Á. Romero-Calvo**, C. Nogales, K. Billings, W. West, H. Schaub, "The Magnetically Enhanced Electrolysis Experiment", Next-Generation Suborbital Researchers Conference, Broomfield, CO, February 27 - March 1, 2023

A25. **Á. Romero-Calvo**, K. Brinkert, "Leveraging Magnetohydrodynamic Mechanisms for Stable and Efficient Microgravity Electrolysis", ECS Meeting 2023, Boston, MA, May 2023, *Invited*

A26. K. Brinkert, **Á. Romero-Calvo**, O. Akay, S. Saravanabavan, E. Sokaly, "(Keyone) Releasing the Bubbles: Efficient Phase Separation in (Photo-)Electrochemical Devices in Microgravity Environment", ECS Meeting 2023, Boston, MA, May 28-June 2, 2023, *Keynote*

A27. O. Akay, K. Brinkert, **Á. Romero-Calvo**, S. Saravanabavan, E. Sokalu, M. Giersig, "Hydrogen Gas Bubble Evolution on Electrocatalytic Nanostructures in Microgravity Environment", ECS Meeting 2023, Boston, MA, May 28-June 2, 2023

A28. S. Saravanabavan, O. Akay, M. Crouch, **A. Romero-Calvo**, K. Brinkert, "Magnetically-Induced Buoyancy for Efficient Electrochemical Oxygen Production in Microgravity", ECS Meeting 2023, Boston, MA, May 28-June 2, 2023

A29. **Á. Romero-Calvo**, "Low-Gravity Ferrohydrodynamics", International Conference on Magnetic Fluids, Granada, SP, June 12-16, 2023

A30. A. Robinson, S. T. Hart, **Á. Romero-Calvo**, "Magnetohydrodynamically Pumped Liquid Metal Loops for SmallSat Thermal Control", Physics REU Presentations, Atlanta, GA, July 21, 2023

A31. E. Comstock, **Á. Romero-Calvo**, "External Plasma-Breathing Magnetohydrodynamic Spacecraft Propulsion", 65th Annual Meeting of the APS Division of Plasma Physics, Denver, CO, Oct. 30-Nov. 3, 2023

A32. Ö. Akay, M. Monfort-Castillo, K. Brinkert, **Á. Romero-Calvo**, "Leveraging Magnetohydrodynamic Mechanisms for Stable and Efficient Electrolysis in Microgravity", ASGSR Meeting 2023, Washington, DC, November 14-18, 2023

A33. S. T. Hart, G. Lightsey, **Á. Romero-Calvo**, "Neutral Buoyancy Testing of Low-Gravity Propellant Management Devices", ASGSR Meeting 2023, Washington, DC, November 14-18, 2023

A34. S. T. Hart, G. Lightsey, **Á. Romero-Calvo**, "Phase Change CubeSat Propellant Management", ASGSR Meeting 2023, Washington, DC, November 14-18, 2023

A35. R. Fonteyne, F. Isidori Pacelli, L. Scifoni, M. Schaible, **Á. Romero-Calvo**, "Enhancing Lunar Dust Mitigation: A Study on Electrodynamic Dust Shield Efficacy through Modeling and Vacuum Experiments", ExplOrigins 2024 Colloquium, Atlanta, GA, Feb. 8-9, 2024

A36. **Á. Romero-Calvo**, C. Nogales, K. Billings, W. West, H. Schaub, "The Magnetically-Enhanced Electrolysis (MEE) Experiment: Design, Results, and Lessons Learned", 2024 COSPAR Scientific Assembly, Busan, South Korea, July 13-21, 2024.

A37. Ö. Akay, K. Brinkert, **Á. Romero-Calvo**, "Optimizing (Photo-)Electrolysis in Microgravity with Magnetohydrodynamic Forces: A Statistical Analysis Approach for Enhanced Efficiency", 2024 COSPAR Scientific Assembly, Busan, South Korea, July 13-21, 2024.

A38. K. Brinkert, Ö. Akay, **Á. Romero-Calvo**, K. Walayat, J. Becker, "Optimizing (Photo-)Electrolysis in Microgravity with Magnetohydrodynamic Forces: A Statistical Analysis Approach for Enhanced Efficiency", 2024 COSPAR Scientific Assembly, Busan, South Korea, July 13-21, 2024.

A39. K. Brinkert, Ö. Akay, **Á. Romero-Calvo**, K. Walayat, J. Becker, "Realizing Efficient (Photo-)Electrochemical Water-Splitting in Space: An Experimental Set-Up for a Suborbital Rocket Flight", 2024 COSPAR Scientific Assembly, Busan, South Korea, July 13-21, 2024.

White papers

P1. Egle Cekanaviciute et al., "NASA Biological and Physical Sciences Outreach for the Next Decade", Decadal Survey on Biological and Physical Sciences (BPS) Research in Space 2023-2032, 2021, https://tinyurl.com/2ppaexv2

P2. Liz Blabber (representing the ASGSR Board), RFI - Sustainability of Microgravity R&D During and Beyond ISS Transition, Office of Science and Technology Policy, 2022

Invited Lectures

I1. **Á. Romero-Calvo**, "ESA Drop Your Thesis! 2017 – The Ferros", ESA Gravity-Related Experiments Training Week 2018, February 7, 2018

I2. **Á. Romero-Calvo**, "ESA Drop Your Thesis! 2017 – The Ferros", ESA/ELGRA Gravity-Related Research Summer School 2018, June 4, 2018

I3. **Á. Romero-Calvo**, "Microgravity Research: our Pathway to Space", Online Global Space Summit, Space Development Nexus, September 14, 2020

I4. **Á. Romero-Calvo**, "UNOOSA DropTES Programme 2018: StELIUM", UNOOSA "DropTES: Master the Microgravity Path" Webinar Series, November 19, 2020

I5. **Á. Romero-Calvo**, "Low-Gravity Fluid Mechanics: A Student Perspective", UNOOSA Webinars on Hyper/Microgravity Research, May 26, 2021

I6. **Á. Romero-Calvo**, "Designing and Testing a Technology Demonstrator in Microgravity", UNOOSA Webinars on Hyper/Microgravity Research, June 2, 2021

I7. **Á. Romero-Calvo**, "Microgravity Science and Technology: Concept, Facilities, and Applications", Space Studies Program 2021, International Space University, August 11, 2021

I8. **Á. Romero-Calvo**, "Magnetohydrodynamics: A New Approach to Low-Gravity Fluid Mechanics", Georgia Tech Institute of Technology, February 14, 2022

I9. **Á. Romero-Calvo**, "Magnetohydrodynamics: A New Approach to Low-Gravity Fluid Mechanics", Massachusetts Institute of Technology, February 22, 2022

I10. **Á. Romero-Calvo**, "Magnetohydrodynamics: A New Approach to Low-Gravity Fluid Mechanics", University of Colorado Boulder, March 7, 2022

I11. **Á. Romero-Calvo**, "Poster Presentations: Preparation & Delivery", Training webinar for the ASGSR Meeting 2022, October 4-5, 2022

I12. **Á. Romero-Calvo**, "A New Approach to Low-Gravity Fluid Mechanics", WEIG Group Meeting, University of Warwick, October 28, 2022

I13. **Á. Romero-Calvo**, "Low-Gravity Fluid Mechanics in the Artemis Era", ASGSR Students Webinars, April 8, 2023

I14. **Á. Romero-Calvo**, "Low-Gravity Technologies for the New Space Age", Morehouse College, August 12, 2023

Public Outreach

Newspaper Articles and Press Notes

1. "Dos estudiantes de la US seleccionados para el programa Drop Your Thesis! 2017 de la Agencia Espacial Europea", Universidad de Sevilla, February 2017
2. "Drop Your Thesis! 2017 Team The Ferros kicking off at ESA Training Week", SELGRA Newsletter, February 2017
3. "Team of students win fellowship from UN to study sloshing", Politecnico di Milano, May 2019
4. "Dos estudiantes de la US seleccionados para el programa DropTES de la Oficina de Naciones Unidas para Asuntos del Espacio Exterior (UNOOSA)", Universidad de Sevilla, May 2019
5. "Un trozo de basura espacial de 1 cm es tan potente como una granada de mano", Antonio Villareal, El Confidencial, August 2019
6. "Un granadino en la cantera de la NASA", Jorge Pastor, Ideal de Granada, August 2019
7. "Estudiantes de la Universidad de Sevilla se preparan para ejecutar su experimento en microgravedad", Universidad de Sevilla, November 2019
8. "StELIUM: Unveiling the physics behind magnetic liquid sloshing in microgravity", SELGRA Newsletter, January 2020
9. "DropTES 6th Cycle: Diary", UNOOSA DropTES Program, January 2020
10. "PhD student wins suborbital research launch competition", Jeff Zehnder, CU Boulder, March 2021
11. "Un experimento del ingeniero aeroespacial Álvaro Romero Calvo viajará en el cohete New Shepard de Blue Origin", *La Caixa* Foundation, March 2021
12. "Extraer hidrógeno y oxígeno del agua con imanes: el experimento de un ingeniero español viaja al espacio", Patricia Biosca, Diario ABC, March 2021
13. "La Luna será una 'gasolinera' camino de Marte", Montserrat Baldomà, El Periódico de Cataluña, March 2021
14. "No nací queriendo ser astronauta", G. Cappa, Granada Hoy, March 2021
15. "Un experimento espacial con talento de Granada", Jorge Pastor, Ideal de Granada, March 2021
16. "La Luna podría ser una gasolinera para llegar a Marte", Irene Hernández Velasco, El Mundo, April 2021
17. "El experimento de Álvaro Romero Calvo será el próximo pasajero del cohete New Shepard de Blue Origin", Asociación de becarios *La Caixa*, La Caixa Foundation, April 2021
18. "La nueva batalla por el despegue del turismo espacial", Patricia Biosca, Diario ABC, July 2021
19. "Aerospace PhD research proposes better way to keep astronauts breathing in space", Jeff Zehnder, CU Boulder, August 2022
20. "Making oxygen with magnets could help astronauts breathe easy", University of Warwick, August 2022
21. "Sauerstoffextraktion Per Magnetismus", Jasmin Plättner, ZARM Institute, August 2022
22. "In a first, researchers produce oxygen from magnets for space exploration", Loukia Papadopoulos, Interesting Engineering, August 2022

23. "Future Astronauts May Breathe Easier in Space Thanks to Magnets", Maddie Bender, Daily Beast, August 2022
24. "Need more air in space? Magnets could yank it out of water", Tatyana Woodall, Popular Science, August 2022
25. "Cómo los imanes podrían ayudarnos a respirar en el espacio", Patricia Biosca, Diario ABC, August 2022
26. Low-Gravity Fluid Mechanics in the Artemis Era, Álvaro Romero-Calvo, AAS Space Times, February 2023
27. "Team OPOSSUM Rises to the Top as the Best Aerospace Engineering Project at the Fall Capstone Expo", Georgia Tech Aerospace, April 2023
28. "Team TRTL Takes Home the Best AE Project from the Capstone Design Expo", Georgia Tech Aerospace, April 2023
29. "Team LOTUS Rises to the Finals in Prestigious NASA Competition", Georgia Tech Aerospace, April 2023
30. "Georgia Tech Dominates at the 2023 AIAA Undergraduate Space Design Competition", Georgia Tech Aerospace, August 2023
31. "AE a Major Force in the Field of Gravitational and Space Research", Georgia Tech Aerospace, December 2023
32. "NASA Selects Professor Álvaro Romero-Calvo to Study New Magnetohydrodynamic Technology", Georgia Tech Aerospace, January 2023

TV Interviews

1. TV program, Universidad de Sevilla TV, November 2017
2. Live TV interview, Despierta Andalucía, Canal Sur TV, March 2021
3. Live TV interview, Informativos Granada, Canal Sur T, March 2021
4. Regular program, Con-Ciencia, Canal Sur TV, March 2021

Radio Interviews

1. Live radio interview, Canal Sur Radio, March 2017
2. "Un experimento del ingeniero español Álvaro Romero se instalará en el cohete New Shepard de Blue Origin", Marcos Ruiz, Ágora Radio, March 2021
3. Live radio interview, Radio Nacional de España, March 2021
4. Live radio interview, La Noche de COPE, April 2021
5. Live radio interview, A Golpe de Bit, Radio Exterior, April 2021
6. "Turismo especial, ¿ecológico?", José Antonio González Martínez, Capital Radio, July 2021

EDUCATION

Courses Taught

1. AE-4321/4322 - Space Systems Design I - Conceptual Design: Fall 2023, Spring 2024
2. AE-4342 - Space Systems Design: Fall 2022, Spring 2023
3. Vertically-Integrated Project (VIP) - Georgia Tech Drop Tower Challenge: Fall 2022, Spring 2023.

Individual Student Guidance

In Progress Ph.D. Students

1. Samuel T. Hart (Fellowship), School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, January 2023 - August 2024, Co-Advised with Prof. Glenn T. Lightsey
2. Eric Comstock (Supported), School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, January 2023 - TBD
3. Hugh Chen (Supported), School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, August 2023 - TBD
4. Romain Fonteyne (Supported), School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, August 2023 - TBD
5. Theo St. Francis (Supported), School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, January 2024 - TBD

In Progress M.S. Students

1. Francesco Maria Isidori Pacelli (GTA - Exchange Program), School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, January 2024 - December 2024
2. Luca Scifoni (GTA - Exchange Program), School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, January 2024 - December 2024
3. Reyouf Alotaibi (Fellowship), School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, October 2023 - December 2024

Other Graduate Students

1. Tianyang Hu (Supported), School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, August 2023 - May 2024

Mentorship of Postdoctoral Fellows and Visiting Scholars

1. Khuram Walayat (Supported), Department of Chemistry, University of Warwick, UK, August 2023 - January 2025, Visiting Scholar

Undergraduate Students (only funded included)

1. Shay Vitale (Supported), School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, January 2023 - December 2023, PURA Award
2. Brian Gonzalez (PURA Award), School of Aerospace Engineering, Georgia Institute of Technology, Atlanta, GA, January 2023 - December 2023, PURA Award
3. Aaron Robinson (NSF REU), School of Physics, Morehouse College, Atlanta, GA, June 2023 - December 2023, NSF REU Physics Program

Educational Innovations and Other Contributions

1. Senior Design Capstone Expo: Promoted student participation at the Georgia Tech Senior Design Capstone Expo with at least 6 out of 8 teams submitting posters every semester, landing 3 best aerospace engineering project awards (Fall 2022, Spring 2023, Fall 2023)
2. Senior Design External Competitions: Promoted student participation at external space systems design competitions, winning the Best Technical Paper award at the 2023 NASA RASCAL competition and the 1st and 3rd awards at the 2023 AIAA Space Systems Design competition.
3. Undergraduate Research Opportunities (URO): Hosted 20-35 undergraduate researchers per semester since Fall 2022, landing three salary President Undergraduate Research Awards (PURA) and multiple travel awards.
4. External: Joined the Kern Entrepreneurial Engineering Network (KEEN) at the January 2023 Atlanta conference and the June 2023 Philadelphia workshop to learn and apply effective entrepreneurial mindset teaching strategies. Ran a 10,000 USD KEEN educational program on AE-4342 Space Systems Design.