Daniele Mortari

Professor of Aerospace Engineering
746C H.R. Bright Building
Ross Street - 3141 TAMU
Texas A&M University
College Station, TX 77843-3141
Tel. (979) 845-0734, Fax (979) 845-6051
E-mail: mortari@tamu.edu
http://mortari.tamu.edu/

1 Areas of Technical Interest

- Satellite Constellations Design
- Spacecraft Attitude and Orbit Estimation
- Sensor Data Processing
- Linear Algebra and Algorithms

2 Education

- 1975-1981: Dottore, Nuclear Engineering, University "La Sapienza," Rome (Italy). May 28, 1981. Dissertation: *On the Safety of the Canadian CANDU Nuclear Reactors*, for Nuclear Reactor Physics, with marks 110/110. Advisor: Prof. Giancarlo Focaccia.

3 Professional Experience

- 2010-: Professor, Aerospace Engineering, Texas A&M University.
- 2007-2010: Tenured Associate Professor, Aerospace Engineering, Texas A&M University.
- 2002-2007: Associate Professor, Aerospace Engineering, Texas A&M University.
- 1998-2001: Visiting Professor, Electronic Engineering, University of Perugia (Italy).
- 1992-2002: Assistant Professor, Aerospace School of Engineering, University of Rome (Italy).
- 1990-1995: Consultant, Computer Control System Company, Rome (Italy), for the Ariane V launcher.
- 1988-1992: Member of San Marco Project staff that operationally manages the San Marco V satellite from launch (1988-1989); developed the attitude determination and control system (1989-1992).
- 1985-1989: Consultant, Ricerca e Progetti Torino, for European Space Agency and Aeritalia Industry contracts.
- 1983-1990: Consultant, Centro di Ricerca Progetto San Marco, an International Co-operative program for space research with NASA-GSFC.

4 Honors and Awards

- **Plenary Lecture**, Global Meet on Aerospace and Aeronautical Engineering (GMAERO2022), Rome (Italy), June 23-25, 2022.
- **2022 Perspective Lecture**, Università degli Studi di Padova, Padova (Italy), March 2022.
- **Fellow**, Asia-Pacific Artificial Intelligence Association (AAIA), June 2021.
- **Member**, International Academy of Astronautics, October 2020.
- **Honorary member**, Associazione Italiana di Aeronautica e Astronautica (AIDAA), September 9, 2019.
- **Plenary Lecture**, XXV International Congress of the Italian Association of Aeronautics and Astronautics, Rome (Italy), September 9-12, 2019.
- NASA Group Achievement Award to "Orion Optical Navigation Team," *for sustained superior performance in developing a new technology to support the safety critical navigation backup for the Orion EM-1 mission*, August 28, 2019.

- **2017 Best Paper Award**, *Mathematics*, March 29, 2019. 2nd prize.
- TEES Faculty Fellow Award, College of Engineering, Texas A&M University, March, 2018.
- Lead member, **winning team**, Star-Identification contest, by Advanced Concepts Team of European Space Agency, September 2107.
- **2015 AAS Dirk Brouwer Award**, *for seminal contributions to the theory and practice of spacecraft orbital and rotational dynamics, particularly attitude determination and satellite constellation design*, February 2016.
- **Fellow**, Institute of Electrical and Electronics Engineers (IEEE),*for contributions to navigational aspects of space systems.* January 2016.
- Herbert H. Richardson Fellow Award, College of Engineering, Texas A&M University, March, 2015.
- William Keeler Memorial Award, Engineering Outstanding Contribution Award, College of Engineering, Texas A&M University, March, 2015.
- **Fellow**, American Astronautical Society (AAS), *for outstanding contributions to astronautics.* September 2012.
- **Best Paper Award**, 20th AAS/AIAA Space Flight Mechanics Meeting Conference, San Diego, CA, February 14-18, 2010.
- **Honorary Member**, IEEE-AESS Space Systems Technical Panel, July 2009.
- NASA Group Achievement Award to "New Millennium ST6 Inertial Stellar Compass Team," *for outstanding accomplishment through development and validation in space of an advanced technology spacecraft attitude determination sensor*, May 18, 2008.
- **2007 IEEE Judith A. Resnik Award**, *for innovative designs of orbiting spacecraft constellations, and efficient algorithms for star identification and spacecraft attitude estimation.*
- Associate Fellow, American Institute of Aeronautics and Astronautics, November 2007.
- **IEEE Distinguished Speaker**, IEEE Distinguished Lectures Program, February 2005.
- Spacecraft Technology Center Award, *for activities related to the StarNav I payload (STS-107).* January 16, 2003.
- NASA Group Achievement Award to "San Marco D/L Project," *in recognition of their dedication, expertise, and outstanding attitude displayed in the San Marco D/L Team, who greatly contributed to enhance the international cooperative studies in the exploration of Earth Atmospheric Science*, May 13, 1989.

5 Editorships

- Proceedings:
  1. Spaceflight Mechanics 2010, 20th Spaceflight Mechanics Meeting Conference, Edited by Mortari, D., Starchville, T.F., Trask, A.J., and Miller, J.K. American Astronautical Society, San Diego. Advances in the Astronautical Sciences. Volume 136, Part I, II, and III.
  2. *The John L. Junkins Astrodynamic Symposium*, Srinivas Rao Vadali and Daniele Mortari, Eds. American Astronautical Society, San Diego, 2003 Paperback: 542 pp., illus. ISBN 0877035067. Advances in the Astronautical Sciences, Vol. 115.
  3. *The F. Landis Markley Astronautics Symposium*, Crassidis, J., Mortari, D., Hoshman, Y., Thienel, J., and Schaub, H. Editors. American Astronautical Society, San Diego, 2003.

- Editor-in-Chief:
  1. *Functional Interpolation* section of Journal *Mathematics*, February 2021-.

- Guest Editor:
  1. *The Journal of the Astronautical Sciences*, Special Issue: The F. Landis Markley Astronautics Symposium. Guest Editors: Crassidis, J.C., Junkins, J.L., Howell, K.C., Mortari, D., Oshman, Y., Schaub, H., and Thienel, J. Vol. 57, Nos. 1 and 2, January-June 2009.
  2. *The Journal of the Astronautical Sciences*, Special Issue: The John L. Junkins Astrodynamics Symposium, Vadali, S.R., Mortari, D., and Howell, K.C. Editors. American Astronautical Society. Vol. 52, Nos. 1 and 2, January-June 2004.
  3. *Sensors*, Special Issue: Attitude Sensors. Guest Editor: Mortari, D. Deadline: 3/31/2020.

4. *Mathematics*, Special Issue: Computational Mathematics, Algorithms, and Data Processing. Guest Editors: Mortari, D., Efendiev, Y., and Hanin, B. December 2020, Pages 172, ISBN 978-3-03943-591-3. https://doi.org/10.3390/books978-3-03943-592-0
5. *Sensors*, Special Issue: Attitude Estimation Based on Data Processing of Sensors, [02/2021-01-2022]

6 Research Grants

6.1 Funded Research Projects at University of Rome "La Sapienza"

1. *Feasibility Study of the Moon-Sun and the Earth-Sun Attitude Sensors: Algorithm Development*, Italian Space Agency, 06/01/99-05/31/00, PI: D. Mortari, Total amount **$86.5K**.
2. *Feasibility Study of the Moon-Sun and the Earth-Sun Attitude Sensors: Ground Tests*, Italian Space Agency, 06/01/00-05/31/01, PI: D. Mortari, Total amount **$75K**.
3. *Feasibility Study of the Multiple FOVs Star Tracker NavStar III*, Italian Space Agency, 04/01/01-09/30/01, PI: D. Mortari, Total amount **$50K**.
4. *Design of an Elegant Breadboard for the Multiple FOVs Star Tracker NavStar III*, Italian Space Agency, 08/14/01-08/13/02, PI: D. Mortari, Total amount **$45K**.
5. *San Marco V Mission*, Italian Ministry for University and Scientific Research, 1983-1991, PI: Prof. L. Broglio, The total budget for this project (involving spacecraft design, development, launch, on-orbit station-keeping, and data processing of the on-board experiments) is $\approx$ **$50M**. Mortari Share $\approx$ **$100K** per year.

6.2 Funded Research Projects at Texas A&M University

1. *Solar Sail Diagnostic Package*, NASA-LaRC, PI: R. Pappa (NASA-LaRC), 06/03-06/04, Total amount $2.3M, D. Mortari Share **$250K**. (Due to ITAR restriction, PI changed to T.C. Pollock).
2. *Mission Planning Studies for Near-Earth Asteroids*, Science Applications International Corporation, PI: J.L. Junkins (TAMU), 02/04-08/04, Total amount $25K, D. Mortari Share **$25K**.
3. *Satellite Situational Awareness Camera System*, Schafer Corporation, PI: N. Combs (STC), 02/22/05-08/31/05, Total amount $240,234, D. Mortari Share **$100K**
4. *Stellar Positioning System*, NASA-MSFC, 06/01/06-05/30/08, PI: D. Mortari, Co-PI: J.L. Junkins, Total amount $85K, D. Mortari Share **$75,288**.
5. *Optimal Reconfiguration of Space Assets and Orbit Design for Responsive Space*, AFRL, FA9453-06-C-0108, PI: D. Mortari, 12/01/05-11/31/06, Total amount $150,001, D. Mortari Share **$50K**.
6. *SEARCH: Space-Eye Awareness and Reconnaissance Camera Hardware*, AFRL, PI: D. Mortari, 05/01/06-04/30/09, Total amount $270K, D. Mortari Share **$100K**.
7. *Constellations for Space Situational Awareness*, Air Force Research Lab., PI: D. Hyland (TAMU), 05/01/06-04/30/09, Total amount $270K, D. Mortari Share **$75K**.
8. *Proposal to AeroAstro for Space Situational Awareness Using Star Trackers (SmartLight)*, AeroAstro, 2622-02-PO 20321, 2/1/06-10/3/06, PI: C. Hill (SERC), Total amount $65K, D. Mortari Share **$33,758**.
9. *CASS: Responsive Space Using Flower Constellations and Periodic Close Encounters*, AFRL, FA9453-06-C-0342, PI: D. Mortari. Dates: 06/01/08-05/30/09, Total amount **$60K**.
10. *Space Situational Awareness Camera System for Space Components*, AFRL, FA9453-07-C-0176, 06/01/07-12/31/09, PI: C. Hill (SERC), Total amount $2,892,661, D. Mortari Share **$648,631**.
    (a) *Additional Funding*, US DoD, 03/18/2008-12/18/2009, PI: C. Hill (SERC), Total amount $1,053,000, D. Mortari Share **$149,895**.
    (b) *Additional Funding*, US DoD, 09/02/2007-09/31/2009, PI: C. Hill (SERC), Total amount $1,408,000, D. Mortari Share **$298,905**.
    (c) *Additional Funding*, US DoD, 03/18/2009-10/18/2011, PI: C. Hill (SERC), Total amount $431,662, D. Mortari Share **$83,374**.
    (d) *Additional Funding*, US DoD, 09/01/2009-10/18/2011, PI: C. Hill (SERC), Total amount $546,000, D. Mortari Share **$76,742**.
11. *Reliable Global Navigation System Using Flower Constellations*, U.S.-Egypt Joint Board on Scientific and Technological Cooperation, NSF 09-29, 04/01/10-03/31/11, PI: D. Mortari, Total amount **$109,978**.

12. *Medusa*, Comtech AeroAstro, Inc., (NRO000-10-R-0286), Inc. PI: C. Hill (SERC/TAMU), Dates: 03/01/11-11/30/11, Total amount $152,521, D. Mortari Share **$28,981.**
13. *Trajectory Estimation using Earth and Moon Images*, NASA-JSC Contract NNX13AF30A-S02, PI: D. Mortari, Dates: 01/01/13-09/30/13, Total amount **$65K**.
14. *Trajectory Estimation using Earth and Moon Images: Extended activities*, NASA-JSC Contract NNX13AF30A-S03, PI: D. Mortari, Dates: 10/01/13-05/30/14, Total amount **$80K**.
15. *Vision-based Navigation for Orion*, NASA-JSC Contract NNX14AK47A, PI: D. Mortari, Dates: 06/11/14-06/10/17, Total amount **$300K**.
16. *Pose Estimation using Stars, Visible Planets, and X-ray Pulsars*, Beyond LEO Navigation Annex, TEES-JSC internal proposal. Space Act Agreement with NASA/JSC Engineering. PI: D. Mortari, Dates: 09/01/16-08/31/17, Total amount: **$50K**.
17. *Ultra-Fine Astronomical Imaging Via Inexpensive Flux Collectors*, NASA-Headquarters, NOI to SpaceTech-REDDI-2016 (NNH16ZOA001N), PI: D. Hyland, Co-I D. Mortari and Co-I R. Skelton, Dates: 01/16/17-01/15/20, Total amount **$500K**. Accepted for funding and then disqualified because of PI retirement.
18. *SimCRAFT - A Virtual Design Platform for Experiential Learning & Collaborative Engineering Design*, PI: G. Chamitoff, Co-Is: S. Girimaji, D. Mortari. TEES internal, Total amount **$100K**.
19. *Comprehensive Sky Compass*, ARMY-SBIR, A16-128, PI: C. Bruccoleri (Lynntech, Inc.), Co-I D. Mortari, Dates: 05/01/17-10/31/17 (Phase I), 02/01/18-06/01/18, Phase I **$30K**.
20. *Spacecraft Position Estimation in Interplanetary Trajectory Using Star Trackers*, NASA-SBIR 2017 Phase I, S3.04, PI: C. Bruccoleri (Lynntech, Inc.), Co-I: D. Mortari, Dates: 06/01/17-11/30/17. Phase I **$27,200**.
21. *Robust Compressive Sampling for Signal Hashing and Matching*, NGA172-001, PI: C. Bruccoleri (Lynntech, Inc.), Co-I: D. Mortari, Dates: 11/01/17-05/01/18. Phase I **$25,200**.
22. *Comprehensive Sky Compass*, ARMY-SBIR, A16-128, PI: C. Bruccoleri (Lynntech, Inc.), Co-I D. Mortari, Dates: 05/01/19-07/30/19 (Phase I Option), 02/01/18-06/01/18, Phase I **$15K**.
23. *Comprehensive Sky Compass*, ARMY-SBIR, A16-128, PI: C. Bruccoleri (Lynntech, Inc.), Co-I D. Mortari, Dates: 08/01/19-07/30/21 (Phase II). Mortari shares **$180K**.
24. *Enhanced Stellar Positioning System*, NASA-MSFC. Technical Excellence internal proposal, PI: D. Mortari, Dates: 04/01/19-03/31/20. Mortari shares **$80K**.
25. *Improving the Fidelity of General Flexible Multibody Dynamic Simulations*, NSTRF19, Ph.D. student Carl Leake, **$80K**/year for four years. Start date August 1, 2019.
26. *Real-time Optimal Guidance via Theory of Connections*, NSTRF19, Ph.D. student Hunter Johnston, **$80K**/year for four years. Start date August 1, 2019.

6.3 Proposal submitted and in preparation at Texas A&M University

1. *Positioning, Navigation and Timing for Target Acquisition*, SBIR Phase I, 20.3 BAA, SOCOM 203-001, PI: C. K.L. Kelly (Lynntech, Inc.), Co-I: D. Mortari, Dates: 03/01/2021-08/31/2021, Mortari shares **$41K**.
2. *Handheld Celestial Navigation System*, SBIR Phase I, 20.3 BAA, SOCOM 203-002, PI: K.L. Kelly (Lynntech, Inc.), Co-I: D. Mortari, Dates: 03/01/21-08/31/21. Mortari shares **$41K**.
3. *Optimal and Autonomous Control via Physics-Informed Neural Networks and Theory of Functional Connection for Aerospace Systems*, NSF Dynamics, Control and Systems Diagnostics (DCSD). PI: Roberto Furfaro (University of Arizona). Co-I D. Mortari, Dates: 09/01/2021-08/31/2024, Mortari shares **$300K**.

6.4 External Member of International Funded Research Projects

1. *The Flower Constellation Set and its Possible Applications*, European Space Agency, PI: M. Ruggieri, Tor Vergata University, Roma (Italy), 03/15/05-09/14/05, Total amount **35K Euros**. Mortari played an advisory role as the project involved Flower Constellations.
2. *FLORAD: Micro-satellite FLOwer Constellation of millimeter-wave RADiometers for Earth and Space Observation at Regional Scale*, Italian Space Agency, March-December 2008, PI: F.S. Marzano, University of Rome (Italy), Duration: 9-months, Total amount **700K Euros**. Mortari played an advisory role as the project involved Flower Constellations.
3. *Órbitas Periódicas y Constelaciones de Satélites Artificiales*, Ministerio de Economìa y Competitividad, ESP2017-87113-R, 01/01/2018-12/31/2021, PIs: Eva Tresaco Vidaller and Antonio Elipe Sánchez. Centro

Universitario de la Defensa, Zaragoza (Spain), Total amount **53K Euros**. Mortari played an advisory role as the project involved Flower Constellations.

4. *EXTREMA: Engineering Extremely Rare Events in Astrodynamics for Deep-Space Mission in Autonomy*, European Research Council, 2021-2025, PI: Francesco Topputo. Politecnico di Milano, Milano (Italy), Total amount: **2,000K Euros**. Mortari played an advisory role as international collaborator for the Optical Navigation aspect.
5. *Orbital Design Techniques for the Computation of Periodic Motion and Satellite Constellation Definition*, Ministerio de Ciencia e Innovación, ESP2020, 01/01/2022-12/31/2025, PIs: Eva Tresaco Vidaller and Antonio Elipe Sánchez. Centro Universitario de la Defensa, Zaragoza (Spain), Total amount **60K Euros**. Mortari played an advisory role as the project involved Flower Constellations.

6.5 Patents and Software Disclosures

- *System and Method for Attitude Determination Based on Optical Imaging*, U.S. Patent No. US 6,556,351 B1, by Junkins, J.L., Pollock, T.C., and Mortari, D., April 29, 2003.
- *The Flower Constellation Visualization and Analysis Tool (FCVAT)*, Software Disclosure by Mortari, D., Wilkins, M.P., and Bruccoleri C., Technology Licensing Office, Texas A&M University, October 15, 2003.
- *The Pyramid Star Identification Software*, Software Disclosure by Mortari, D. and Bruccoleri C., Technology Licensing Office, Texas A&M University.
- *The Recursive Star Identification Software*, Software Disclosure by Mortari, D., Samaan, M.A., and Junkins, J.L., Technology Licensing Office, Texas A&M University.
- *The Non-Dimensional Star Identification Software*, Software Disclosure by Mortari, D., Samaan, M.A., and Junkins, J.L., Technology Licensing Office, Texas A&M University.
- *The Compass Star Tracker*, Invention Disclosure by Mortari, D., Samaan, M.A., and Junkins, J.L., Technology Licensing Office, Texas A&M University.
- *Provisional Patent Application* by D. Boyle, T.C. Pollock, and D. Mortari for "Use of Star Trackers for Space Situational Awareness," Technology Licensing Office, Texas A&M University.
- *Provisional Patent Application* by J. Cantrell, D. Boyle, T.C. Pollock, and D. Mortari for "Identification of Non-Star Objects Using a Star Tracker Mechanism," Technology Licensing Office, Texas A&M University.
- *Provisional Patent Application* TAMUS 4251 by D. Mortari for "n-dimensional k-vector range searching," Technology Licensing Office, Texas A&M University.
- *Star Tracker Software Package*, exclusive Texas A&M license to Space Micro Inc., San Diego, CA. This includes Pyramid Star Identification (Dr. D. Mortari) and In-flight calibration (Dr. J.L. Junkins)

7 Student Research Advising

Doctorate [17]

1. Dr. Emilio Francesco Morandini†, Ph.D., *Sensori ed Algoritmi per la Determinazione Puntuale dell'Assetto in Campo Spaziale*, Aerospace School of Engineering, University of Rome, May 15, 1994.
2. Dr. Park, Keun Joo, Ph.D., Co-Chair, *GPS Receiver Self Survey and Attitude Determination Using Pseudolite Signals*, Aerospace Engineering, Texas A&M University. August 2004. Now Senior Researcher, Korea Aerospace Research Institute.
3. Dr. Wilkins, Matthew Paul, Ph.D., Co-Chair, *The Flower Constellations - Theory, Design Process, and Applications*, Aerospace Engineering, Texas A&M University. December 2004. Now Senior Scientist/Engineer at Schafer Corporation.
4. Dr. Abdelkhalik, Ossama Mohamed Omar, Ph.D., *Orbit Design and Estimation for Surveillance Missions using Genetic Algorithms*, Aerospace Engineering, Texas A&M University. December 2005. Now **Associate Professor**, Iowa State University, Aerospace Engineering, Ames, IA.
5. Dr. Bruccoleri, Christian, Ph.D., *Flower Constellations Optimization and Implementation*, Aerospace Engineering, Texas A&M University. December 2007. Now scientist at Lynntech, College Station, TX.
6. Dr. Spratling, Benjamin Barnett IV, Ph.D., *Star-ND: Multi-Dimensional Star-Identification*, Aerospace Engineering, Texas A&M University. August 2010. Now Research Scientist at Wolfram Research, Inc.

Champaign IL.

7. Dr. Henderson, Troy A., Ph.D., Co-Chair, *A Learning Approach to Sampling Optimization: Applications in Astrodynamics*, Aerospace Engineering, Texas A&M University. December 2010. Now **Assistant Professor**, Aerospace Engineering, Embry-Riddle Aeronautical University, Daytona Beach, FL.
8. Dr. Davis, Jeremy J., Ph.D., Co-Chair, *Constellation Reconfiguration Tools and Analysis*, Aerospace Engineering, Texas A&M University. Defended on May 12, 2010. Graduated August 2010. **2005 NSF Graduate Research Fellowship**. Now **Director of Engineering**, VectorNav Technologies, Richardson, TX.
9. Dr. Flewelling, Roy Brien, Ph.D., Co-Chair, *3D Multi-Field Multi-Scale Features From Range Data in Spacecraft Proximity Operations*, Aerospace Engineering, Texas A&M University. **Bradley Fellow, SMART Scholar, Astronaut Scholar.** Defended on March 6, 2011. Graduation May 2012.
10. Dr. Karimi, Reza Raymond, Ph.D., *Designing an Interplanetary Autonomous Spacecraft Navigation System using Visible Planets*, Aerospace Engineering, Texas A&M University. Outstanding Graduate Teaching Assistant Award, Department of Engineering Technology and Industrial Distribution. Lowy Award Winner, Fall 2008. Defended on March 9, 2011. Graduation May 2012. Now at Mission Design & Navigation Section, NASA - Jet Propulsion Laboratory, Pasadena, CA.
11. Dr. Missel, Jonathan William, Ph.D., *Active Space Debris Removal Using Capture and Ejection*, Aerospace Engineering, Texas A&M University. **2010 National Defense Science and Engineering Graduate Fellowship**. Defended on March 6, 2013. Graduated May 2013. Now Sr. Staff at Exelis, McLean, VA.
12. Dr. de Dilectis, Francesco, Ph.D., *Vision-based Autonomous Navigation using Moon and Earth Images*, Aerospace Engineering, Texas A&M University. Defended on October 17, 2014. Graduated December 2014.
13. Dr. Lee, Sanghyun, Ph.D., *Coverage Optimization Using Lattice Flower Constellations*, Aerospace Engineering, Texas A&M University. **2010 Republic of Korea Air Force Academy Fellowship**. Defended on March 12, 2015. Graduated May 2015. Now **Associate Professor**, Aerospace Engineering, Republic Of Korea Air Force Academy.
14. Dr. Arimura Fialho, Márcio Afonso, Ph.D., Co-Chair, *Improved Star Identification Algorithms and Techniques for Monochrome and Color Star Trackers*, **Conselho Nacional de Desenvolvimento Cientifico e Tecnologico Fellowship.** Engineering and Space Technologies, Instituto Nacional de Pesquisas Espaciais (INPE). São José dos Campos, SP - Brasil. Defended on August 17, 2017.
15. Dr. Borissov, Stoian R., Ph.D., *Autonomous Navigation for Spacecraft using Stars, Planets, and Pulsars*, Aerospace Engineering, Texas A&M University. 2013 Texas A&M University Dwight Look College of Engineering Graduate Enhancement Fellowship. Defended on March 5, 2020. Graduated May 2020.
16. Johnston, Hunter, Ph.D., *The Theory of Functional Connections: A Journey from Theory to Application*, Aerospace Engineering, Texas A&M University. August 2021. **2019 NASA Space Technology Research Fellowship**: 80NSSC19K1149.
17. Leake, Carl, Ph.D., *The Multivariate Theory of Functional Connections: An n-Dimensional Constraint Embedding Technique Applied to Partial Differential Equations*, Aerospace Engineering, Texas A&M University. August 2021. **2019 NASA Space Technology Research Fellowship**: 80NSSC19K1152.

Masters [19]

1. Alessandro Sigalot, MS, *Problemi di Determinazione d'Assetto di Satelliti Artificiali e Identificazione di Stelle con Sensori Stellari*, Physics, University of Rome, 1996.
2. Davide Paciulli, MS, *Analisi ed Algoritmi per l'Elaborazione Dati di un Sensore Luni-Solare*, Electronics Engineering, University of Perugia, 1997.
3. Michela Angelucci, MS, *Sensori Stellari a Campi di Vista Multipli: Identificazione Stellare e Disallineamento*, Aerospace Engineering, University of Rome, 1999.
4. Mauro Bellezza, MS, *Problematiche di Elaborazione Dati e di Sistema per le Prove a Terra di un Sensore Luni-Solare*, Electronics Engineering, University of Perugia, June 2001.
5. Aurora Ntumba, MS, *Identificazione Stellare per il Sensore d'Assetto a Tre Campi di Vista StarNav III*, Electronics Engineering, University of Perugia, September 2001.
6. Silvia Sangiorgi, MS, *ASTRIUM Internship: Unusual behaviour study of the TWTAs, Travelling Wave Tube Amplifiers, Embarked in ASTRIUM Telecommunications Satellites*, Electronics Engineering, University of Perugia, January 2002.

7. Serena La Rosa, MS, *Sviluppo di un Sistema Autonomo di Identificazione Stellare*, Electronics Engineering, University of Perugia, March 2002.
8. Christian Bruccoleri, MS Chair, *Elaborazione di Immagini Stellari per la Navigazione Aerospaziale*, Informatics Engineering, University of Rome, March 2002.
9. Ettouati, Iohan. MS-nonthesis. Aerospace Engineering, Texas A&M University, August 2006.
10. Shah, Vinanti. MS-nonthesis. Aerospace Engineering, Texas A&M University, August 2007.
11. Bourgeois, Scott K., *Rock-Around Orbits*, Aerospace Engineering, Texas A&M University, December 2009.
12. Caruth, Chase, MEN-nonthesis, Aerospace Engineering, Texas A&M University. December 17, 2010.
13. Mandakh, Enkh, MS, *BOUQUET: A Satellite Constellation Visualization Program for Walker's and Lattice Flower Constellations*, Aerospace Engineering, Texas A&M University, August 2011. Now employed by MathWorks, Natick, MA.
14. Schaeperkoetter, Andrew Vernon, MS, *A Comprehensive Comparison Between Angle-Only Initial Orbit Determination Techniques*, Aerospace Engineering, Texas A&M University, August 2011.
15. Jones, Peter, MEng, Aerospace Engineering, Texas A&M University. Fall 2019.
16. Hunter, Rylan, MS, Co-chair, Aerospace Engineering, Texas A&M University. Fall 2020.
17. Gardner, Anthony, MS, Co-chair, Aerospace Engineering, Texas A&M University. August 2021.
18. Arleth, Gregory, MS, Co-chair, *Application of Theory of Functional Connections for Optimal Control of Nonlinear Systems*, Aerospace Engineering, Texas A&M University, August 2021.
19. Bae, Jiwon, MS, Aerospace Engineering, Texas A&M University, Starting August 2021.

Research Associates Supervised [13]

1. Dr. Critchley-Marros, Joshua, University of Sydney (Australia). Visiting scholar, from 1/3/2022 to 12/19/2022. Under American-Australian Association Graduate Scholarship Program.
2. Dr. Allan Kardec de Almeida Junior, National Institute for Space Research, São José dos Campos, SP - Brasil. Visiting scholar, from 1/1/2020 to 12/31/2020. Under Brazilian FAPESP Fellowship.
3. Dr. Allan Kardec de Almeida Junior, National Institute for Space Research, São José dos Campos, SP - Brasil. Visiting scholar, from 1/1/2020 to 12/31/2020. Under Brazilian FAPESP Fellowship.
4. Dr. David Arnas, Mathematics, Universidad de Zaragoza. Visiting scholar, from March 3 to June 29, 2016 and from March 1 to August 15, 2019. **Assistant Professor**, Purdue University.
5. Dr. Kevin Yunhe Wu, Kevin, Beijing Institute of Tracking and Telecommunication Technology, Beijing University of Aeronautics and Astronautics, Beijing (People's Republic of China), Visiting scholar, from 06/01/2013 to 05/31/2014.
6. Dr. Casanova, Daniel, Department of Applied Mathematics, University of Zaragoza (Spain), Visiting scholar, from 08/20/2010 to 11/20/2010. **Assistant Professor**, Centro Universitario de la Defensa, Zaragoza (Spain).
7. Dr. Zhang, Gang, School of Astronautics, Harbin Polytechnical University, Harbin, (P.R. China), Visiting scholar, 12/09-12/10. **Professor**, Harbin Polytechnical University, Harbin, (P.R. China).
8. Dr. Ning, Yu, School of Astronautics, Northwestern Polytechnical University, Shaanxi (P.R. China), Visiting scholar, 01/09-12/10.
9. Dr. Avendaño, Martin, Visiting Assistant Professor, Mathematics, Texas A&M University, Post-doc, 09/01/08-08/31/09. **Associate Professor**, Centro Universitario de la Defensa, Zaragoza (Spain).
10. Prof. Rugescu, Radu, Chair of Aerospace Sciences "Elie Carafoli," University Politehnica of Bucharest (Romania), Fulbright Senior Scholar Award, visiting scholar. Several terms during years 2007-2009.
11. Dott. Tonetti, Stefania, Aerospace Engineering, Polytechnic of Milan (Italy), Visiting scholar, 09/01/06-04/30/07.
12. Dott. Clocchiatti, Alberto, Aerospace Engineering, Polytechnic of Milan (Italy), Visiting scholar, 10/01/05-03/30/06.
13. Dr. Abdelkhalik, Ossama, Post-doc, Aerospace Engineering, Texas A&M University, 12/18/05-08/28/06. **Associate Professor**, Iowa State University, MI.

8 Publications

8.1 Journal Publications [117]

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8.2 Textbooks

8.2.1 Textbooks Chapters [4]

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8.3 Conference Publications [241]

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111. Woodbury, D. and Mortari, D. "Tracking Objects with Unknown Dynamics," AAS 09-237, 2009 AAS/AIAA Space Flight Mechanics Meeting Conference, Savannah, GA, February 9-12, 2009.
112. Marzano, F.S., Cimini, D., Montopoli, M., Rossi, T., Mortari, D., Di Michele, S., and Bauer, P. "Flower Elliptical Constellation of Millimeter-Wave Radiometers for Precipitating Cloud Monitoring at Geostationary Scale," European Geosciences Union General Assembly 2009, Vienna, Austria, April 19-24, 2009.
113. Varchetta, S., Marzano, F.S., Cimini, D., Rossi, T., and Mortari, D. "FLOMIR: the Light-Weight Conical-

Scan Millimetre-Wave Imaging-Sounding Radiometer," 5th ESA Workshop on Millimetre Wave Technology and Applications and 31st ESA Antenna Workshop Millimeter and Sub-Millimeter Waves: From Technologies to Systems. ESTEC, Noordwijk, The Netherlands, May 18-20, 2009.

114. Karimi, R.R., Henderson, T.A. and Mortari, D. "Satellite Collision Detection and Avoidance using Star Trackers," AAS 09-302, 2009 AAS/AIAA Astrodynamics Specialist Conference, Pittsburgh, PA, August 9-13, 2009.
115. Koh, B.S. and Mortari, D. "Adaptive Angular Velocity Estimator," AAS 09-314, 2009 AAS/AIAA AstrodynaBanjectory Optimization Problem," AAS 09-333, 2009 AAS/AIAA Astrodynamics Specialist Conference, Pittsburgh, PA, August 9-13, 2009.
116. Bourgeois, S. and Mortari, D. "Rock-Around Orbits," AAS 09-343, 2009 AAS/AIAA Astrodynamics Specialist Conference, Pittsburgh, PA, August 9-13, 2009.
117. Karimi, R.R. and Mortari, D. "Nonlinear Adaptive Control of a LEO Satellite Perturbed by Atmospheric Drag, J_2 Effect, and Moon Gravity," AAS 09-363, 2009 AAS/AIAA Astrodynamics Specialist Conference, Pittsburgh, PA, August 9-13, 2009.
118. Davis, J., Avendano, M.E., and Mortari, D. "A Closed-Form Solution to the Minimum Δv_{tot}^2 Lambert's Problem," AAS 09-364, 2009 AAS/AIAA Astrodynamics Specialist Conference, Pittsburgh, PA, August 9-13, 2009.
119. Flewelling, B.R. and Mortari, D. "Information Theoretic Weighting for Robust Star Centroiding," AAS 09-385, 2009 AAS/AIAA Astrodynamics Specialist Conference, Pittsburgh, PA, August 9-13, 2009.
120. Hill, C., Talley, T., Mortari, D., Pollock, T., Lagoudas, M., and Henley, J. "Space Situational Awareness Camera System," Space Protection Conference, Kirtland AFB, Albuquerque, NM. August 25-27, 2009.
121. Varchetta, S., Oricchio, D., Marzano, F.S., Cimini, D., Rossi, T., and Mortari D. "Conically-Scanning Radiometer Design for Satellite Remote Sensing Applications," European Microwave Week 2009, Nuova Fiera di Roma, Roma, Italy, Sept. 28 - Oct. 2, 2009.
122. Rugescu, R.D., Mortari, D., Tache, F., Silivestru, V., and Ionescu, M.D. "Composites Technology in PUBSAT and NERVA Spacecraft," International Aerospace Symposium of South Africa (IASSA) 2009, Pretoria, South Africa, Nov. 23-25, 2009.
123. Karimi, R.R. and Mortari, D. "An Adaptive Scheme on Optimal Number of Observations and Time Intervals for an Initial Orbit Determination Problem," AAS 10-152, AAS/AIAA Space Flight Mechanics Meeting Conference, 2010, San Diego, CA, February 8-12.
124. Avendaño, M.E., Davis, J.J., and Mortari, D. "The Lattice Theory of Flower Constellations," AAS 10-172, 20th AAS/AIAA Space Flight Mechanics Meeting, San Diego, CA, February 14-18, 2010.
125. Davis, J.J., Avendaño, M.E., and Mortari, D. "Elliptical Lattice Flower Constellations for Global Coverage," AAS 10-173, 20th AAS/AIAA Space Flight Mechanics Meeting, San Diego, CA, February 14-18, 2010.
126. Spratling, B.B. and Mortari, D. "Recursive Star Identification with the K-Vector ND," AAS 10-206, AAS/AIAA Space Flight Mechanics Meeting Conference, San Diego, CA, February 14-18, 2010.
127. Spratling, B.B. and Mortari, D. "Star-ND: Multidimensional Star-Identification," AAS 10-207, AAS/AIAA Space Flight Mechanics Meeting Conference, San Diego, CA, February 14-18, 2010. **Conference Best Paper Award**.
128. Karimi, R.R. and Mortari, D. "Orbit Determination Using Prescribed Orbits," AAS 10-236, AAS/AIAA Space Flight Mechanics Meeting Conference, San Diego, CA, February 14-18, 2010.
129. Henderson, T.A. and Mortari, D. "Modifications to the Gooding Algorithm for Angles-Only Initial Orbit Determination," AAS 10-238, AAS/AIAA Space Flight Mechanics Meeting Conference, San Diego, CA, February 14-18, 2010.
130. Henderson, T.A., Mortari, D., Avendaño, M.E., and Denton, R.D. "Admissible n-impulse Orbit Transfer and Rendezvous Solved Using a Learning Optimization Algorithm," AAS 10-252, AAS/AIAA Space Flight Mechanics Meeting Conference, San Diego, CA, February 14-18, 2010.
131. Mortari, D., Davis, J.J., and Denton, R.D. "Constrained n-impulse Periodic Close Encounters," AAS 10-261, AAS/AIAA Space Flight Mechanics Meeting Conference, San Diego, CA, February 14-18, 2010.
132. Ning, Y., Avendaño, M.E., and Mortari, D. "Distance Preserved Satellite Clusters," AAS 10-262, AAS/AIAA Space Flight Mechanics Meeting Conference, San Diego, CA, February 14-18, 2010.
133. Marzano, F.S., Cimini, D., Rossi, T., Mortari, D., Di Michele, S., and Bauer, P. "High-repetition Millimeter-wave Passive Remote Sensing of Humidity and Hydrometeor Profiles from Elliptical Orbit Constellations,"

11th Specialist Meeting on Microwave Radiometry and Remote Sensing of the Environment, Washington, DC, March 1-4, 2010.

134. Kalmár-Nagy, T. and Mortari, D. "Control of the Restricted Three-Body Problem," *Kyle T. Alfriend* Astrodynamics Symposium, Monterey, CA, May 17-19, 2010.
135. Talley, T., Hill, C., Davalos, P., Pollock, T., Mortari, D., Tappendorf, A., Kennedy, S., and Wolfe, K. "Calibration and Testing of Small Cameras Using PC Based Tools," AIAA Small Satellite Conference, Logan, UT, August 9-12, 2010.
136. Manning, W., Tappendorf, A., Mortari, D., Henderson, T., Denton, R., and Davalos, P. "Improved Space-Based, Angles-Only Orbit Estimation," Space Protection Conference, Kirtland AFB, Albuquerque, NM, August 24-25, 2010.
137. Rugescu, R., Mortari, D., and Farcasan, I. "Staging Mechanism Status of the Orbital Launcher Nerva," 61-th International Astronautical Congress 2010, Prague, Czech Republic, Sept. 27 - Oct. 1, 2010.
138. Schaeperkoetter, A. and Mortari, D. "A Comprehensive Comparison between Angle-only Initial Orbit Determination Techniques," AAS 10-116, AAS/AIAA Space Flight Mechanics Meeting Conference, New Orleans, LO, February 13-17, 2011.
139. Karimi, R.R. and Mortari, D. "On Laplace's Orbit Determination Method: Some Modifications," AAS 10-121, AAS/AIAA Space Flight Mechanics Meeting Conference, New Orleans, LO, February 13-17, 2011.
140. Ning, Y. and Mortari, D. "Attitude Estimation Using Multiplicative Measurement Model," AAS 10-133, AAS/AIAA Space Flight Mechanics Meeting Conference, New Orleans, LO, February 13-17, 2011.
141. Flewelling, B. and Mortari, D. "Enhancements to the k-vector Search Technique," AAS 10-135, AAS/AIAA Space Flight Mechanics Meeting Conference, New Orleans, LO, February 13-17, 2011.
142. Ning, Y. and Mortari, D. "Position Estimation Using Multiplicative Measurement Model," AAS 10-143, AAS/AIAA Space Flight Mechanics Meeting Conference, New Orleans, LO, February 13-17, 2011.
143. de Dilectis, F. and Mortari, D. "Analytic Orbit Design for Earth Sites Observation," AAS 10-147, AAS/AIAA Space Flight Mechanics Meeting Conference, New Orleans, LO, February 13-17, 2011.
144. Casanova, D., Avendaño, M.E., and Mortari, D. "Necklace Theory on Flower Constellations," AAS 10-226, AAS/AIAA Space Flight Mechanics Meeting Conference, New Orleans, LO, February 13-17, 2011.
145. Missel, J. and Mortari, D. "Sling Satellite for Debris Removal with Aggie Sweeper," AAS 10-256, AAS/AIAA Space Flight Mechanics Meeting Conference, New Orleans, LO, February 13-17, 2011.
146. Mortari, D., Avendaño, M.E., and Davalos, P. "Uniform Distribution of Points on a Sphere with Application in Aerospace Engineering," AAS 10-261, AAS/AIAA Space Flight Mechanics Meeting Conference, New Orleans, LO, February 13-17, 2011.
147. Avendaño, M.E., Rojas, M., and Mortari, D. "Minimum Fuel Multi-impulse Orbit Transfer," Mini-symposium Algebraic Geometry Applied to Celestial Mechanics of SIAM Conference on Applied Algebraic Geometry, North Carolina State University, Raleigh NC, October 6-9, 2011.
148. Mortari, D. and Avendaño, M.E. "Evolution of Flower Constellations Theory," Mini-symposium Algebraic Geometry Applied to Celestial Mechanics of SIAM Conference on Applied Algebraic Geometry, North Carolina State University, Raleigh NC, October 6-9, 2011.
149. Zanetti, R., DeMars, K.J., and Mortari, D. "Novel Multiplicative Unscented Kalman Filter for Attitude Estimation," AAS 12-125, AAS/AIAA Space Flight Mechanics Meeting Conference, Charleston, SC, Jan. 29 - Feb. 2, 2012.
150. Sanghyun, L. and Mortari, D. "Circular Lattice String-of-pearls Constellations for Radio Occultation Missions," AAS 12-144, AAS/AIAA Space Flight Mechanics Meeting Conference, Charleston, SC, Jan. 29 - Feb. 2, 2012.
151. Davis, J., and Mortari, D. "Reducing Walker, Flower, and Streets-of-Coverage Constellations to a Single Constellation Design Framework," AAS 12-147, AAS/AIAA Space Flight Mechanics Meeting Conference, Charleston, SC, Jan. 29 - Feb. 2, 2012.
152. Missel, J. and Mortari, D. "Optimization of Debris Removal Path for TAMU Sweeper," AAS 12-167, AAS/AIAA Space Flight Mechanics Meeting Conference, Charleston, SC, Jan. 29 - Feb. 2, 2012.
153. Karimi, R.R. and Mortari, D. "Orbit Determination Based on Variation of Orbital Elements," AAS 12-201, AAS/AIAA Space Flight Mechanics Meeting Conference, Charleston, SC, Jan. 29 - Feb. 2, 2012.
154. de Dilectis, F. and Mortari, D. "Optimal Use of Perturbations for Space Missions," AAS 12-235, AAS/AIAA Space Flight Mechanics Meeting Conference, Charleston, SC, Jan. 29 - Feb. 2, 2012.

155. Casanova, D., Avendaño, M.E., and Mortari, D. "Flower Constellation Optimization using Evolutionary Algorithms," XIII Jornadas de Trabajo en Mecánica Celeste, Zaragoza, June 18-19, 2012.
156. Mortari, D. and Rogers, J. "A k-vector Approach to Sampling, Interpolation, and Approximation," AAS 12-624, AAS/AIAA Jer-Nan Juang Astronautics Symposium, College Station, TX, June 24-26, 2012.
157. Bani-Younes, A., Mortari, D., Turner, J.D., and Junkins, J.L. "A Survey of Attitude Error Representations for Nonlinear Tracking Control," AIAA-2012-4422 of the 2012 AAS/AIAA Astrodynamics Specialist Conference, Minneapolis, MN, August 13-16, 2012.
158. Mortari, D., Avendaño, M.E., and Sanghyun, L. "J_2-Propelled Orbits and Constellations," AIAA-2012-4969 of the 2012 AAS/AIAA Astrodynamics Specialist Conference, Minneapolis, MN, August 13-16, 2012.
159. Casanova, D., Avendaño, M.E., and Mortari, D. "Optimizing Flower Constellations for Global Coverage," AIAA-2012-4805 of the 2012 AAS/AIAA Astrodynamics Specialist Conference, Minneapolis, MN, August 13-16, 2012.
160. Mortari, D., Davis, J.D., Owis, A., and Mohamed, H. "Reliable Global Navigation System using Flower Constellation," First International Conference on New Trends and Applications of GNSS, Cairo - Giza (Egypt), September 1-4, 2012.
161. Owis, H.A., Mohammed, H.M., Dwidar, H., and Mortari, D. "Accurate Doppler Shift Computation of an Artificial Satellite," First International Conference on New Trends and Applications of GNSS, Cairo - Giza (Egypt), September 1-4, 2012.
162. de Dilectis, F., Mortari, D., and Zanetti, R. "Trajectory Determination with Unknown Perturbations," AAS 13-778, 2013 AAS/AIAA Astrodynamics Specialist Conference, Hilton Head, SC, August 11-15, 2013.
163. Kim, D. and Mortari, D. "Conic Sections by Rational Bézier Functions," AAS 13-724, 2013 AAS/AIAA Astrodynamics Specialist Conference, Hilton Head, SC, August 11-15, 2013.
164. Mortari, D. and Elipe, A. "Solving Kepler's Equation using Implicit Functions," AAS 13-726, 2013 AAS/AIAA Astrodynamics Specialist Conference, Hilton Head, SC, August 11-15, 2013.
165. Mortari, D. and Avendaño, M.E. "Reflection Decomposition of Rotation Matrices," AAS 13-727, 2013 AAS/AIAA Astrodynamics Specialist Conference, Hilton Head, SC, August 11-15, 2013.
166. Lee, S. and Mortari, D. "Improved Uniform Points on a Sphere with Application to any Geographical Data Distribution," AAS 13-729, 2013 AAS/AIAA Astrodynamics Specialist Conference, Hilton Head, SC, August 11-15, 2013.
167. Mortari, D., de Dilectis, F., and D'Souza, C. "Image Processing of Illuminated Ellipsoid," AAS 13-853, 2013 AAS/AIAA Astrodynamics Specialist Conference, Hilton Head, SC, August 11-15, 2013.
168. Karimi, R.R. and Mortari, D. "A Performance Based Comparison of Angle-only Initial Orbit Determination Methods," AAS 13-823, 2013 AAS/AIAA Astrodynamics Specialist Conference, Hilton Head, SC, August 11-15, 2013.
169. Kim, D. and Mortari, D. "Applications of Implicit Functions to Orbital Mechanics Problems," AAS 14-231, 2014 AAS/AIAA Space Flight Mechanics Meeting Conference, Santa Fe, NM, Jan. 26-30, 2014.
170. Borissov, S. and Mortari, D. "Pose Estimation using Optical Camera in Lunar Orbit," AAS 14-247, 2014 AAS/AIAA Space Flight Mechanics Meeting Conference, Santa Fe, NM, Jan. 26-30, 2014.
171. de Dilectis, F. and Mortari, D. "Bézier Description of Space Trajectories," AAS 14-294, 2014 AAS/AIAA Space Flight Mechanics Meeting Conference, Santa Fe, NM, Jan. 26-30, 2014.
172. Mortari, D. and Avendaño, M.E. "Mapping to Compensate Radial Geometrical Distortions in Pin-hole Cameras," AAS 14-144, 2014 AAS/AIAA Space Flight Mechanics Meeting Conference, Santa Fe, NM, Jan. 26-30, 2014.
173. Mortari, D. "Memory Adaptive k-vector," AAS 14-302, 2014 AAS/AIAA Space Flight Mechanics Meeting Conference, Santa Fe, NM, Jan. 26-30, 2014.
174. Lee, S. and Mortari, D. "Optimization of Lattice Flower Constellations for Intensity Correlation Interferometric Missions," AAS 14-407, 2014 AAS/AIAA Space Flight Mechanics Meeting Conference, Santa Fe, NM, Jan. 26-30, 2014.
175. Borissov, S., de Dilectis, F., and Mortari, D. "k-vector Approach for Massive Solutions of Kepler Equation," AAS 14-433, 2014 AAS/AIAA Space Flight Mechanics Meeting Conference, Santa Fe, NM, Jan. 26-30, 2014.
176. Borissov, S. and Mortari, D. "Pose Estimation Assessment using GEO Satellites Identification," AAS 15-248, 2015 AAS/AIAA Space Flight Mechanics Meeting Conference, Williamsburg, VA, Jan. 12-15, 2015.
177. Mortari, D. and Akella, M. "Discrete and Continuous Time Adaptive Angular Velocity Estimators," AAS

15-254, 2015 AAS/AIAA Space Flight Mechanics Meeting Conference, Williamsburg, VA, Jan. 12-15, 2015.

178. Mortari, D., de Dilectis, F., and Zanetti, R. "Position Estimation using Image Derivative," AAS 15-259, 2015 AAS/AIAA Space Flight Mechanics Meeting Conference, Williamsburg, VA, Jan. 12-15, 2015.
179. Lee, S. and Mortari, D. "Design of Constellations for Earth Observation with Inter-satellite Links," AAS 15-303, 2015 AAS/AIAA Space Flight Mechanics Meeting Conference, Williamsburg, VA, Jan. 12-15, 2015.
180. Mortari, D. and Furfaro, R. "Fast Selection of Debris Subset for Conjunction Analysis using k-vector," AAS 15-366, 2015 AAS/AIAA Space Flight Mechanics Meeting Conference, Williamsburg, VA, Jan. 12-15, 2015.
181. Conway, D. and Mortari, D. "Single-point and Filtered Relative Position Estimation for Visual Docking," International Conference on Computational and Experimental Engineering and Sciences (ICCES), Reno, NV, July 20-24 2015.
182. Fialho, M.A.A., Perondi, L.F., and Mortari, D. "Development of an Autonomous Star Tracker," 6-th Workshop em Engenharia e Tecnologia Espaciais, Terca-feira, July 21, 2015.
183. Borissov, S., Wu, Y., and Mortari, D. "East-West GEO Station-keeping with Degraded Thrusters Response," AAS 15-512, 2015 AAS/AIAA Astrodynamics Specialist Conference, Vail, CO, Aug. 9-13, 2015.
184. Mortari, D. and Conway, D. "Single-point Position Estimation in Interplanetary Trajectories using Star Trackers," AAS 15-660, 2015 AAS/AIAA Astrodynamics Specialist Conference, Vail, CO, Aug. 9-13, 2015.
185. Borissov, S. and Mortari, D. "Image processing of Earth and Moon Images for Optical Navigation Systems," AAS 15-744, 2015 AAS/AIAA Astrodynamics Specialist Conference, Vail, CO, Aug. 9-13, 2015.
186. Lee, S., Avendaño, M.E., and Mortari, D. "Uniform and Weighted Coverage for Large Lattice Flower Constellations," AAS 15-790, 2015 AAS/AIAA Astrodynamics Specialist Conference, Vail, CO, Aug. 9-13, 2015.
187. Mortari, D. "10 Years of Flower Constellations," Society of Engineering Science, 52-nd Annual Technical Meeting, Texas A&M University, October 26-28, 2015.
188. Mortari, D., Fialho, M.A.A., and Lockhart, S.A. "Star Centroid on the f-radius Sphere using von Mises-Fisher Probability Distribution," AAS 16-287, 2016 AAS/AIAA Space Flight Mechanics Meeting Conference, Napa, CA, Feb. 14-18, 2016.
189. Mortari, D. and Hyland, D. "The Theory of Lattice Flower Formations and its Application to Intensity Correlation Interferometry," AAS 16-298, 2016 AAS/AIAA Space Flight Mechanics Meeting Conference, Napa, CA, Feb. 14-18, 2016.
190. Fialho, M.A.A., Mortari, D., and Perondi, L.F. "Ideas for Multispectral Cameras with Stacked Pixels for Star Tracking and Optical Navigation," AAS 16-321, 2016 AAS/AIAA Space Flight Mechanics Meeting Conference, Napa, CA, Feb. 14-18, 2016.
191. Fialho, M.A.A., Perondi, L.F., and Mortari, D. "The Brazilian Autonomous Star Tracker Development," AAS 16-322, 2016 AAS/AIAA Space Flight Mechanics Meeting Conference, Napa, CA, Feb. 14-18, 2016.
192. Mortari, D. and Borissov, S. "Moon and Earth Image Processing using Asymmetric 2-D Gaussian Function on Image Gradient," AAS 16-341, 2016 AAS/AIAA Space Flight Mechanics Meeting Conference, Napa, CA, Feb. 14-18, 2016.
193. Bani-Younes, A. and Mortari, D. "Attitude Error Kinematics: Applications in Control," AAS 16-429, 2016 AAS/AIAA Space Flight Mechanics Meeting Conference, Napa, CA, Feb. 14-18, 2016.
194. Borissov, S. and Mortari, D. "Preliminary Investigation in Interstellar Navigation Techniques," AAS 16-442, 2016 AAS/AIAA Space Flight Mechanics Meeting Conference, Napa, CA, Feb. 14-18, 2016.
195. Bani-Younes, A. and Mortari, D. "Attitude Error Kinematics: Applications in Estimation," AAS 16-458, 2016 AAS/AIAA Space Flight Mechanics Meeting Conference, Napa, CA, Feb. 14-18, 2016.
196. Arnas, D., Fialho, M.A.A., and Mortari, D. "Robust Triad and Quad Generation Algorithms For Star Trackers," AAS 17-232, 2017 AAS/AIAA Space Flight Mechanics Meeting Conference, San Antonio, TX, February 5-9, 2017.
197. Arnas, D. and Mortari, D. "Optimal k-vector to Invert Nonlinear Functions," AAS 17-235, 2017 AAS/AIAA Space Flight Mechanics Meeting Conference, San Antonio, TX, February 5-9, 2017.
198. Mortari, D. "The Theory of Connections. Part 1: Connecting Points," AAS 17-255, 2017 AAS/AIAA Space Flight Mechanics Meeting Conference, San Antonio, TX, February 5-9, 2017.
199. Mortari, D. "Least-squares Solutions of Linear Differential Equations," AAS 17-256, 2017 AAS/AIAA Space Flight Mechanics Meeting Conference, San Antonio, TX, February 5-9, 2017.
200. Arnas, D. and Mortari, D. "Random Number Generation using k-vector," AAS 17-297, 2017 AAS/AIAA

Space Flight Mechanics Meeting Conference, San Antonio, TX, February 5-9, 2017.

201. Arnas, D., Casanova, D., Tresaco, E., and Mortari, D. "3D Lattice Flower Constellations using Necklaces," AAS 17-234, 2017 AAS/AIAA Space Flight Mechanics Meeting Conference, San Antonio, TX, February 5-9, 2017.
202. Fialho, M.A.A. and Mortari, D. "Performance Tests of the Pyramid Star-ID Algorithm with Memory Adaptive k-vector," AAS 17-311, 2017 AAS/AIAA Space Flight Mechanics Meeting Conference, San Antonio, TX, February 5-9, 2017.
203. Fialho, M.A.A. and Mortari, D. "Nonlinear k-vector," AAS 17-485, 2017 AAS/AIAA Space Flight Mechanics Meeting Conference, San Antonio, TX, February 5-9, 2017.
204. Borissov, S., Mortari, D., Vlasak, W., Butcher, J., and Bridges, G. "Pulsar Navigation: Defining an upper Bound for Distance from Reference," 2017 AAS/AIAA Astrodynamics Specialist Conference, Stevenson, WA, August 20-24, 2017.
205. Mortari, D., Johnston, H., and Smith, L. "Least-squares Solutions of Nonlinear Differential Equations," 2018 AAS/AIAA Space Flight Mechanics Meeting Conference, Kissimmee, FL, January 8-12, 2018.
206. Mortari, D., Leake, C., and Borissov, S. "The n-dimensional k-vector with Applications," 2018 AAS/AIAA Space Flight Mechanics Meeting Conference, Kissimmee, FL, January 8-12, 2018.
207. Borissov, S. and Mortari, D. "Centroiding and Sizing Optimization of Ellipsoid Image Processing using Nonlinear Least-Squares," AAS 18-229, 2018 AAS/AIAA Astrodynamics Specialist Conference, Snowbird, UT, August 19-23, 2018.
208. Mortari, D. and Furfaro, R. "Theory of Connections Applied to First-Order System of Ordinary Differential Equations Subject to Component Constraints," AAS 18-230, 2018 AAS/AIAA Astrodynamics Specialist Conference, Snowbird, UT, August 19-23, 2018.
209. Zhang, G. and Mortari, D. "Comparison Between First and Second-Order Gauss Variational Equations under Impulsive Control," AAS 18-233, 2018 AAS/AIAA Astrodynamics Specialist Conference, Snowbird, UT, August 19-23, 2018.
210. Johnston, H. and Mortari, D. "Linear Differential Equations Subject to Relative, Integral, and Infinite Constraints," AAS 18-273, 2018 AAS/AIAA Astrodynamics Specialist Conference, Snowbird, UT, August 19-23, 2018.
211. Johnston, H. and Mortari, D. "Theory of Connections Solution to Perturbed Lambert's Problem," AAS 18-282, 2018 AAS/AIAA Astrodynamics Specialist Conference, Snowbird, UT, August 19-23, 2018.
212. Leake, C., Arnas, D., and Mortari, D. "Applications of the Dynamic n-dimensional k-vector," AAS 18-283, 2018 AAS/AIAA Astrodynamics Specialist Conference, Snowbird, UT, August 19-23, 2018.
213. Leake, C. and Mortari, D. "The f-radius Sphere Model. Theory and Analysis," AAS 18-285, 2018 AAS/AIAA Astrodynamics Specialist Conference, Snowbird, UT, August 19-23, 2018.
214. McConnell, S., McCarthy, M., Buchanan, T., Tang, K., Wasson, M., Young, T., Borissov, S., and Mortari, D. "X-Ray Pulsar Navigation Position Determination using Spherical Volumes," AAS 18-354, 2018 AAS/AIAA Astrodynamics Specialist Conference, Snowbird, UT, August 19-23, 2018.
215. Furfaro, R. and Mortari, D. "Least-squares Solution of a Class of Optimal Guidance Problems," AAS 18-362, 2018 AAS/AIAA Astrodynamics Specialist Conference, Snowbird, UT, August 19-23, 2018.
216. de Almeida, M.M., Zanetti, R., Mortari, D., and Akella, M. "Real-Time Angular Velocity Estimation Of Non-Cooperative Space Objects Using Camera Measurements," AAS 18-420 of the 2018 AAS/AIAA Astrodynamics Specialist Conference, Snowbird, UT, August 19-23, 2018.
217. Razoumny, Y.N., Mortari, D., Lee, S., and Avendaño, M. "Flower Constellations for Earth Coverage with Big Number of Satellites," IAC-18-F1.2.3, 69th International Astronautical Congress (IAC), Bremen (Germany), October 1-5, 2018.
218. Mortari, D. "The Theory of Connections: Connecting Functions," IAA-AAS-SciTech-072, First IAA/AAS SciTech Forum 2on Space Flight Mechanics and Space Structure and Materials, Peoples' Friendship University of Russia, Moscow (Russia), November 13-15, 2018.
219. Johnston, H. and Mortari, D. "Weighted Least-Squares Solutions of Over-Constrained Differential Equations," IAA-AAS-SciTech-081, First IAA/AAS SciTech Forum 2on Space Flight Mechanics and Space Structure and Materials, Peoples' Friendship University of Russia, Moscow (Russia), November 13-15, 2018.
220. Mortari, D., Razoumny, Y., Samusenko, O., Novikova, V., and Nam Quy, N. "Optimal Two-tier Satellite Constellation for Continuous Coverage of Spherical Layer of Near-Earth Space," First IAA/AAS SciTech

Forum 2on Space Flight Mechanics and Space Structure and Materials, Peoples' Friendship University of Russia, Moscow (Russia), November 13-15, 2018.

221. McHenry, N., Hunt, T., Chamitoff, G. and Mortari, D. "Virtual Reality as a Testbed for Star Tracker Algorithms," AIAA 2019-1713 SciTech 2019, San Diego (CA), January 7-11, 2019.
222. Leake, C. and Mortari, D. "Recursive and Non-dimensional Star-Identification," AAS 19-609, of the 2019 AAS/AIAA Astrodynamics Specialist Conference, Portland, ME, August 11-15, 2019.
223. Zhang, G. and Mortari, D. "Impulsive Least-Squares Orbit Maintenance using Gauss's Variational Equations," AAS 19-613, of the 2019 AAS/AIAA Astrodynamics Specialist Conference, Portland, ME, August 11-15, 2019.
224. Arnas, D., Leake, C., and Mortari, D. "Orthogonal Range Searching in n-dimensional Spaces using k-vector," AAS 19-629, of the 2019 AAS/AIAA Astrodynamics Specialist Conference, Portland, ME, August 11-15, 2019.
225. de Almeida, M.M., Mortari, D., Zanetti, R., and Akella, M. "QuateRA: The Quaternion Regression Algorithm," AAS 19-654, of the 2019 AAS/AIAA Astrodynamics Specialist Conference, Portland, ME, August 11-15, 2019.
226. Drozd, K., Furfaro, R., and Mortari, D. "Constrained Energy-Optimal Guidance in Relative Motion via Theory of Functional Connections and Rapidly-Explored Random Trees," AAS 19-662, 2019 AAS/AIAA Astrodynamics Specialist Conference, Portland, ME, August 11-15, 2019.
227. Mortari, D., Mai, T., and Efendiev, Y. "Theory of Functional Connections Applied to Nonlinear Programming under Equality Constraints," AAS 19-675, of the 2019 AAS/AIAA Astrodynamics Specialist Conference, Portland, ME, August 11-15, 2019.
228. Schiassi, E., Furfaro, R., Johnston, H., and Mortari, D. "Fuel-efficient Powered Descent Guidance on Planetary Bodies via Theory of Functional Connection," AAS 19-718, of the 2019 AAS/AIAA Astrodynamics Specialist Conference, Portland, ME, August 11-15, 2019.
229. Johnston, H., Leake, C., and Mortari, D. "An Analysis of the Theory of Functional Connections Subject to Inequality Constraints," AAS 19-732, of the 2019 AAS/AIAA Astrodynamics Specialist Conference, Portland, ME, August 11-15, 2019.
230. Leake, C. and Mortari, D. "An Explanation and Implementation of the Multivariate Theory of Functional Connections via Examples," AAS 19-734, 2019 AAS/AIAA Astrodynamics Specialist Conference, Portland, ME, August 11-15, 2019.
231. Johnston, H. and Mortari, D. "Orbit Propagation via the Theory of Functional Connections," AAS 19-736, 2019 AAS/AIAA Astrodynamics Specialist Conference, Portland, ME, August 11-15, 2019.
232. Mai, T. and Mortari, D. "Theory of Functional Connections Applied to Nonlinear Programming subject to Equality Constraints," The 4-th German–Russian Workshop on Numerical Methods and Mathematical Modelling in Geophysical and Biomedical Sciences, Far Eastern Federal University campus, Island Russky, Vladivostok (Russia), October 7-11, 2019
233. Mortari, D. "The Theory of Functional Connections: Current Status," XXV International Congress of the Italian Association of Aeronautics and Astronautics, Rome (Italy), September 9-12, 2019.
234. Furfaro, R., Drozd, K., and Mortari, D. "Energy-Optimal Rendezvous Spacecraft Guidance via Theory of Functional Connections," 70th International Astronautical Congress 2019, IAF Astrodynamics Symposium, Washington, D.C., October 21-25, 2019.
235. Arnas, D., Lifson, M., Linares, R., Avendaño, M., and Mortari, D. "Low Earth Orbital Traffic Management through Slotting," IAA-UT Space Traffic Management Conference STM 2020. Paper IAA-UT-STM-02-01, February 19-20, 2020, Austin TX.
236. Furfaro, R., Schiassi, E., Drozd, K., and Mortari, D. "Physics-Informed Neural Networks and Theory of Functional Connections for Optimal Space Guidance Applications," IAC 2020, 71st International Astronautical Congress, 12-16 October 2020, Dubai, United Arab Emirates.
237. Schiassi, E., D'Ambrosio, A., Johnston, H., De Florio, M., Furfaro, R., Curti, F., and Mortari, D. "Physics-Informed Solution of Optimal Control Problems via Extreme Theory of Functional Connections," AAS 20-524, Astrodynamics Specialist Conference, August 9-12, Lake Tahoe, CA.
238. Johnston, H., Leake, C., de Almeida, M.M., and Mortari, D. "Recursive Star-Identification Algorithm using an Adaptive SVD-based Angular Velocity Estimator," AAS 20-545, Astrodynamics Specialist Conference, August 9-12, Lake Tahoe, CA.

239. Gardner, A., Johnston, H., Leake, C., Mortari, D., and Anzalone, E. "Star Tracker Based Inertial State Estimation on Planetary Bodies. An Update on the Stellar Positioning System," AAS 20-548, Astrodynamics Specialist Conference, August 9-12, Lake Tahoe, CA.
240. Schiassi, E., D'Ambrosio, A., Johnston, H., Furfaro, R., Curti, F., and Mortari, D. "Complete Energy Optimal Landing on Small and Large Planetary Bobies via Theory of Functional Connections," AAS 20-557, Astrodynamics Specialist Conference, August 9-12, Lake Tahoe, CA.
241. De Almeida Junior, A.K., Leake, C., Johnston, H., and Mortari, D. "Evaluation of transfer costs in the Earth-Moon system using the Theory of Functional Connections," AAS 20-596, Astrodynamics Specialist Conference, August 9-12, Lake Tahoe, CA.
242. Furfaro, R., Schiassi, E., Drozd, K., and Mortari, D. "Physics-Informed Neural Networks and Theory of Functional Connections for Optimal Space Guidance Applications," IAC 2020, 71-st International Astronautical Congress, 12-16 October 2020, Dubai, United Arab Emirates.
243. Johnston, H., Lo, W.M., and Mortari, D. "A Functional Interpolation Approach to Compute Periodic Orbits in the Circular Restricted Three-Body Problem," AAS 21-257, 31-st AAS/AIAA Virtual Space Flight Mechanics Meeting, February 1-4, 2021, Charlotte, NC.

9 Professional Societies

- **Member**, International Academy of Astronautics (IAA), October 2020.
- **Fellow**, Institute of Electrical and Electronics Engineers (IEEE), January 2016-.
- **Honorary Member**, IEEE-AESS Space Systems Technical Panel, September 2009-.
- **Fellow**, American Astronautical Society; 2012-.
- Associate Fellow, American Institute of Aeronautics and Astronautics; 2009-.

10 Professional Activities

- Member, AAS Space Flight Mechanics Technical Committee, August 2019.
- Session Chair, 2003 AAS *John L. Junkins* Astrodynamics Symposium, Texas A&M University, College Station, TX, May 23-24, 2003; 2005 AAS *Malcolm D. Shuster* Astronautics Symposium, University at Buffalo, State University of New York, June 13-15, 2005; *X Workshop on Celestial Mechanics*, Universitat Autònoma de Barcelona, Barcelona, Spain, September 5-7, 2007; *Satellite Constellations*, 2009 AIAA/AAS Astrodynamics Specialist Conference, Pittsburgh, PA, August 9-13, 2009; and 2008 AAS *F. Landis Markley* Astronautics Symposium, June 29 - July 2, 2008. Hyatt Regency Chesapeake Bay Golf Resort, Spa and Marina, Cambridge MD.
- Program Committee, *International Conference on Dynamics and Control of Systems and Structures in Space 2006*, Greenwich, London, England, July 16-20, 2006; *International Conference on Dynamics and Control of Systems and Structures in Space 2004*, Riomaggiore, Italy, 18-22 July, 2004; Technical Program Committee, International Event *Aerospace Technologies and Applications for Dual Use*, Rome (Italy), September 12-14, 2007; ICNPAA 2008 - Seventh International Conference on *Mathematical Problems in Engineering, Aerospace and Sciences*, Genova (Italy), June 25-27, 2008; 2009 IEEE Congress on Evolutionary Computation (IEEE CEC 2009), Trondheim, Norway, May 18-21, 2009; Satellite and Positioning Systems Track, 2010 IEEE 71-st Vehicular Technology Conference, Taipei, Taiwan, May 16-19, 2010; *The first International IEEE-AESS Conference in Europe about Space and Satellite Telecommunications*, Rome (Italy), October 2-5, 2012. IEEE *International Workshop on Metrology for Aerospace* (IEEE MetroAerospace 2014), Benevento, Italy, May, 29-30 2014. 4th IAA Conference on Dynamics and Control of Space Systems (DYCOSS 2018), 21-23 May 2018, Changsha, China.
- **Distinguished Speaker**, IEEE Distinguished Lectures Program, February 2005.
- Member, AAS Space Flight Mechanics Technical Committee, September 2006.
- Member, 2008 and 2009 IEEE Judith A. Resnik Award Committee, October 2007.
- Member, International Advisory Board, Space Mission "FLORAD."
- **Conference Technical Chair**, 20th AAS/AIAA Space Flight Mechanics Meeting, San Diego, CA, February 14-18, 2010.

- Abstract Review Committee, International Symposium on Asteroid Mitigation, Texas A&M University, College Station, TX, September 20-22, 2010.
- Co-Organizer, 2003 AAS *John L. Junkins* Astrodynamics Symposium, Texas A&M University, College Station, TX, May 23-24, 2003.
- Mini-symposium organizer, *Algebraic Geometry Applied to Celestial Mechanics*, of 2011 SIAM Conference on Applied Algebraic Geometry, North Carolina State University, Raleigh, NC, October 6-9, 2011.
- Member, Hiring Committee of Associate Professor, Politecnico di Milano, Milano (Italy), May, 2016.

11 Invited Seminars [98]

1. *Applications of the Theory of Functional Connections to Aerospace Engineering*, **Plenary Lecture**, Global Meet on Aerospace and Aeronautical Engineering (GMAERO2022), Rome (Italy), June 23-25, 2022.
2. *The Theory of Functional Connections with Applications*, **Perspective Lecture**, Università degli Studi di Padova (Italy), March, 2022.
3. *From Art to Science: The Flower Constellations*, Online lecture to the Corso di Dottorato in Scienze, Tecnologie e Misure Spaziali (STMS) of Ateneo di Studi e Attività Spaziali "Giuseppe Colombo" (CISAS), University of Padova (Italy), January 15, 2021.
4. *Current Status of the Theory of Functional Connections with Applications*, **Online Highlighted Lecture**, IAA SciTech Forum on Space Flight Mechanics and Space Structures and Materials, Moscow (Russia), December 9, 2020.
5. *From Art to Science: The Flower Constellations*, Summer School 2020 Online lecture, Aeronautical and Space Engineering, University of Rome "La Sapienza," Rome (Italy), July 24, 2020.
6. *Applications of Functional Connections to Optimization*, Summer School 2020 Online lecture, Aeronautical and Space Engineering, University of Rome "La Sapienza," Rome (Italy), July 10, 2020.
7. *The Theory of Functional Connections: Current Summary*, Aerospace Engineering Seminar Series, Texas A&M University, College Station TX, October 31, 2019.
8. *From Art to Science: The Flower Constellations Theory Evolution*, **Plenary Lecture**, XXV International Congress of the Italian Association of Aeronautics and Astronautics, Rome (Italy), September 9-12, 2019.
9. *Multivariate Theory of Connections*, **Highlighted Lecture**, IAA SciTech Forum on Space Flight Mechanics and Space Structures and Materials, Moscow (Russia), June 25-27, 2019.
10. *Theory of Connections for Solving Differential Equations*, IV International Conference "Supercomputer Technologies of Mathematical Modeling," (SCTeMM19), Steklov Institute of Mathematics, Russian Academy of Science, Moscow (Russia), June 19-21, 2019.
11. *Multivariate Theory of Connections*, **1)** Jet Propulsion Laboratory, Pasadena CA, May, 2019, and **2)** California Institute of Technology, Pasadena CA, May, 2019.
12. **a)** *From Art to Science: The Flower Constellations* and **b)** *Multivariate Theory of Connections*, The Aerospace Corporation, El Segundo CA, May, 2019.
13. *Space Research at the Aerospace Department of Texas A&M University*, Federal University of ABC, Bangú, Santo André (Brazil), December 12, 2018.
14. **a)** *The Theory of Connections: Current Status* (12/11/18), **b)** *Optical Navigation using Star Trackers* (12/13/18), and **c)** *From Art to Science: The Flower Constellations* (12/14/18), Instituto Nacional de Pesquisas Espaciais, São José dos Campos (Brazil), December 2018.
15. **a)** *From Art to Science: The Flower Constellations*, and **b)** *The Theory of Connections: Current Status*, XIX Colóquio Brasileiro de Dinâmica Orbital, CBDO, 2018, INPE - São José dos Campos (Brazil), December 3-7, 2018.
16. **a)** *From Art to Science: The Flower Constellations Theory Evolution* **Highlighted Lecture** and **b)** *The Theory of Connections with Applications in Engineering*, IAA SciTech Forum on Space Flight Mechanics and Space Structures and Materials, Moscow (Russia), November 13-15, 2018.
17. **a)** *Flower Constellations: From Art to Science*, **b)** *The Theory of Connections with Applications in Engineering*, and **c)** *Optical Navigation (OpNav) using Star trackers*, at Korea Air Force Academy (Cheongju), at Korea Aerospace Research Institute (Daejeon), and at Korea Agency for Defense Development (Jeonju), South Korea, June-July 2018.
18. **a)** *Flower Constellations: From Art to Science*, **b)** *The Theory of Connections with Applications in Engi-*

neering, and **c)** *Optical Navigation (OpNav) using Star trackers*, at Peoples' Friendship University of Russia, Moscow (Russia), May 13-18, 2018.

19. *The Theory of Connections with Applications in Engineering*, Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, Austin TX, April 24, 2018.
20. **a)** *k-vector Range Searching with Applications* and **b)** *Least-squares Solutions of Differential Equations*, MathWorks, Natick, MS, August 16, 2017.
21. *The Theory of Connections with Applications*, XVI Jornadas de Trabajo en Mecánica Celeste, Soria (Spain), June 19-21, 2017.
22. *From Art to Science: The Satellite Constellation Design Evolution*, 57th Israel Annual Conference on Aerospace Sciences, Tel Aviv and Technion Campus at Haifa (Israel). March 15-16, 2017.
23. *The Theory of Connections with Application*, Aerospace Engineering Seminar Series, Texas A&M University, College Station TX, March 2, 2017.
24. *The Theory Evolution of Flower Constellations*, Thales Alenia Space Italia, Rome (Italy). October 4, 2016.
25. *New Applications using k-vector*, Centro Universitario de la Defensa, Zaragoza (Spain), September 21, 2016.
26. *Space Magic*, National Scholar Invitational, Engineering Honors Program, Texas A&M University, June 14, 2016.
27. *The Flower Satellite Constellations Theory Evolution*, NewSpace Global, LLC, Cape Canaveral, FL. June 17-18, 2016.
28. *Attitude estimation: an introduction, overview of current method, open issues*, Naval Postgraduate School, Monterey, CA. May 10, 2016.
29. *Rotation in multiple dimensions*, Naval Postgraduate School, Monterey, CA. May 11, 2016.
30. *The Flower Satellite Constellations Theory Evolution*, Naval Postgraduate School, Monterey, CA. May 12, 2016.
31. *The Flower Satellite Constellations Theory Evolution*, Google, Mountain View, CA. May 9-10, 2016.
32. *The Flower Satellite Constellations Theory Evolution*, Aeronautics and Astronautics, Massachusetts Institute of Technology, Cambridge, MA. April 8, 2016.
33. *The Flower Satellite Constellations Theory Evolution*, Mechanical Engineering, McGill University, Montreal (Canada). April 6, 2016.
34. *The Flower Satellite Constellations Theory Evolution*, Mechanical and Aerospace Engineering, University of Buffalo, NY. April 4, 2016.
35. *The Flower Satellite Constellations Theory Evolution*, Aerospace Engineering Seminar Series, Texas A&M University, College Station, TX. March 3, 2016.
36. *From Broglio's "Sistema Quadrifoglio" to the Necklace Problem on Flower Constellations*, 11-th Conference of Italian Researchers in the World, Italian Consulate Auditorium, Feb. 27, 2016.
37. *The Flower Satellite Constellations Theory Evolution*, **Dirk Brouwer Plenary Lecture**, 2016 AAS/AIAA Space Flight Mechanics Meeting, Napa, CA. February 15, 2016.
38. *10 years of Flower Constellations*, Society of Engineering Science, 52-nd Annual Technical Meeting, Texas A&M University, October 26-28, 2015.
39. *Constellation for Earth Observation with Inter-Satellite Links*, KinetX, Tempe, AZ, April 25, 2015.
40. *Autonomous Position Estimation using Visible Camera*, Aerospace and Mechanical Engineering, The University of Arizona, Tucson AZ, April 24, 2015.
41. *Vision-based Position Estimation for NASA's Orion Missions*, Centro Universitario de la Defensa, University of Zaragoza, Zaragoza (Spain), December 11, 2014.
42. *Flower Constellations: Solutions looking for Problems*, Department of Mechanical Engineering at Columbia University's Fu Foundation School of Engineering and Applied Science, New York, NY, September 26, 2014.
43. *Research and Experiences of a Professor of Aerospace Engineering*, Texas A&M Students for the Exploration & Development of Space (SEDS), Texas A&M University, College Station TX, April 16, 2014.
44. *Autonomous Position Estimation using Visible Camera*, Aerospace Engineering and Engineering Mechanics, The University of Texas at Austin, Austin TX, February 20, 2014.
45. *Flower Constellations*, KinetX, Tempe, AZ, December 12, 2013.
46. *Vision-based Attitude and Position Estimation using Moon or Earth Images*, IEEE-AESS/GOLD and AFCEA **Invited talk**, Electronic Engineering, Tor Vergata University, Rome (Italy), July 4, 2013.
47. *Flower Constellations for Future Space Applications*, Centro Universitario de la Defensa, University of

Zaragoza, Zaragoza (Spain), June 24, 2013.

48. *Aerospace Applications using Rotations in n-Dimensional Spaces*, **IEEE Distinguished Lecture**, Indian Institute of Science, Bangalore (India), December 13, 2012.
49. *Flower Constellations for Future Space Missions*, **IEEE Distinguished Lecture**, Indian Institute of Science, Bangalore (India), December 12, 2012.
50. *Flower Constellations for Future Space Missions*, ESTEL *The first International IEEE-AESS Conference in Europe about Space and Satellite Telecommunications*, Rome (Italy), October 2-5, 2012.
51. *Evolution of Flower Constellations Mathematical Theory*, in mini-symposium *Algebraic Geometry Applied to Celestial Mechanics*, of 2011 SIAM Conference on Applied Algebraic Geometry, North Carolina State University, Raleigh, NC, October 6-9, 2011.
52. *Evolution of Flower Constellations Mathematical Theory*, 3rd International Symposium on Applied Sciences in Biomedical and Communication Technologies, Rome (Italy), November 8, 2010.
53. *Aerospace Applications using Rotations in n-Dimensional Spaces*, **IEEE Gold Lecture**, Department of Electronic Engineering, Università degli Studi di Roma "La Sapienza", Rome (Italy), June 25, 2010.
54. *Recent Surprises: Attitude Rate Estimation using n-Dimension Rotations and the Multiplicative Measurement Model*, **IEEE Distinguished Lecture**, National School of Engineers, University of Sfax, Sfax (Tunisia), December 12, 2009.
55. *Flower Constellations: Toward a New Theory*, **IEEE Distinguished Lecture**, National School of Engineers, University of Sfax, Sfax (Tunisia), December 11, 2009.
56. *Flower Constellations: Toward a New Theory*, The Aerospace Engineering Seminar Series, Texas A&M University, September 17, 2009.
57. *Flower Constellations: Toward a New Theory*, New Department of Aerospace Engineering Inauguration, Università degli Studi di Roma "La Sapienza", Rome (Italy), July 7, 2009.
58. *Flower Constellations: Toward a New Theory*, **IEEE Distinguished Lecture**, The 125th IEEE and 50th IEEE-Italy Anniversaries: The Future of Engineering, Villa Mondragone - Sala degli Svizzeri, Via Frascati 51, Monte Porzio Catone, Roma (Italy). July 6, 2009.
59. *Flower Constellations: Toward a New Theory*, XII Workshop on Celestial Mechanics, Lalín (Spain), July 1-3, 2009.
60. *n-impulse Orbit Transfer and Rendezvous for Evolutionary Algorithms*, Department of Electronic Engineering, Università degli Studi di Roma "La Sapienza", Rome (Italy), June 24, 2009.
61. *Multiplicative Measurement Model and Spacecraft Attitude Estimation*, **IEEE Distinguished Lecture**, Department of Electronic Engineering, Università degli Studi di Roma "La Sapienza", Rome (Italy), July 11, 2008.
62. *FLORAD Flower Constellation*, Italian Space Agency, Rome (Italy), July 7, 2008.
63. *Theory and Applications of Flower Constellations*, **IEEE Distinguished Lecture**, Gilruth Center at NASA's Johnson Space Center, Houston TX, December 5, 2007.
64. *Optimization of Flower Constellation for Dual Use*, **Invited talk**, International Symposium on "Aerospace Technologies and Applications for Dual Use", Rome (Italy), September 14, 2007.
65. *Theory and Applications of Flower Constellations*, X Workshop on Celestial Mechanics, Centre de Recerca Matemàtica, Universitat Autònoma de Barcelona, Barcelona (Spain), September 7, 2007.
66. *Bernstein, Bézier, de Casteljau, and 350 years of Kepler's Equation*, Grupo de Mecànica Espacial, Universitat de Zaragoza, Zaragoza (Spain), September 3, 2007.
67. *Design Flower Constellations: a Cool Problem for Math Students!* Seminar for Math 662: Algebraic Methods in Computational Biology, Department of Mathematics, Texas A&M University, College Station, June 22, 2007.
68. "Flower Constellations and Flower Formation Flying," Air Force Scientific Advisory Board, San Antonio TX, April 11, 2007.
69. *The Flower Constellations Toolbox*, Advanced Concepts Division, European Space Agency, Frascati (Italy), 06/16/06.
70. *The Flower Constellations Theory*, Advanced Concepts Division, European Space Agency, Frascati (Italy), 06/16/06.
71. *Bernstein, Bézier, de Casteljau, and 350 years of Kepler's Equation*, **IEEE Distinguished Lecture** for "Advanced Systems for Communication and Satellite Navigation," Electronic Engineering, Tor Vergata

University, Rome, 06/15/06. Invited by Prof. M. Ruggieri.

72. *Bernstein, Bézier, de Casteljau, and 350 years of Kepler's Equation*, Computer Sciences and Visualization Laboratory (TexGraph 2006 Conference), Texas A&M University, College Station, TX, 05/06/06. Invited by Prof. E. Akleman.
73. *Bernstein, Bézier, de Casteljau, and 350 years of Kepler's Equation*, AERO-681 Seminar Series, Texas A&M University, College Station, TX, 04/25/06.
74. *Flower Constellations as Rigid Objects in Space*, 2006 Innovative System Design Concepts Workshop, Space Research and Technology Center, European Space Agency, Noordwijk (The Netherlands), 02/21/06. Invited by Dr. R. Walker and Dr. D. Izzo.
75. *On a Family of Real Curves Arising from Satellite Placement*, Geometry Seminar Series, Mathematics, Texas A&M University, College Station, TX, 09/09/05.
76. *Advances in Constellation Design: The Flower Constellation Set*, **IEEE Distinguished Lecture** for "Advanced Systems for Communication and Satellite Navigation," Electronic Engineering, Tor Vergata University, Rome, 07/18/05. Invited by Prof. M. Ruggieri.
77. *Advances in Constellation Design: The Flower Constellation Set*, Advanced Concepts Division, Space Research and Technology Center, European Space Agency, Noordwijk (The Netherlands), 07/06/05. Invited by Dr. F. Ongaro and Dr. D. Izzo.
78. *Satellite Ballet with Flower Constellation*, Computer Sciences and Visualization Laboratory (TexGraph-2005 Conference), Texas A&M University, College Station, TX, 05/07/05. Invited by Prof. E. Akleman.
79. *Flower Constellation: a New Space Object*, Aerospace Engineering and Engineering Mechanics, University of Texas, Austin TX, 04/14/05. Invited by Prof. M. Akella.
80. *The Flower Constellations*, IEEE Seminar, Aerospace Engineering, Tor Vergata University, Rome, 07/12/04.
81. *Secondary Paths in Flower Constellations*, Algebra and Combinatorics Seminar, Mathematics, Texas A&M University, College Station, TX, 01/30/04.
82. *The Flower Constellation Set*, NASA-JPL, Pasadena, CA, 01/15/04.
83. *The Flower Constellations*, College of Architecture, Texas A&M University, College Station, TX, 11/25/03.
84. *Space Magic*, AERO-101 Seminars, Texas A&M University. Given on: 10/10/03, 02/27/04, 10/08/04, 03/04/05, 10/07/05, and 02/17/06.
85. *The Flower Constellations*, Aerospace and Ocean Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA, 09/21/03. Invited by Prof. C. Hall.
86. *The Flower Constellations*, **AIAA Learn and Lunch Talk**, NASA-JSC, Houston, TX, 06/11/03. Presented by my student M.P. Wilkins because of access restriction to NASA-JSC.
87. *Conformal Mapping among Orthogonal, Symmetric, and Skew-Symmetric Matrices*, AERO 681 Seminar Series, Aerospace Engineering, Texas A&M University, College Station, TX, 02/04/03.
88. *ESOQ: From Theory to Application*, Aerospace Engineering, Texas A&M University, College Station, TX, 03/07/02, Invited by Prof. R. Talreja and Prof. J.L. Junkins.
89. *General One-to-One Mapping Among Orientation Matrices*, Aerospace Engineering, Texas A&M University, College Station, TX, 03/07/02, Invited by Prof. R. Talreja and Prof. J.L. Junkins.
90. *From Planar to General Rotation in the n-Dimensional Spaces*, Instituto de Sistemas e Robotica, Instituto Superior Tecnico of Lisbon, Technical University of Lisboa (Portugal), 05/03/01. Invited by Prof. P.U. Lima.
91. *From Planar to General Rotation in the n-Dimensional Spaces*, Aerospace Engineering, University of Texas, Austin, TX, 09/15/00, Invited by Prof. M. Akella.
92. *Ortho-Skew and Ortho-Sym Matrices: the Extension of the Imaginary Unit to n-Dimensional Spaces*, Aerospace Engineering, Texas A&M University, College Station, TX, 09/14/00. Invited by Prof. J.L. Junkins.
93. *From Planar to General Rotation in the n-Dimensional Spaces*, Aerospace Engineering, Texas A&M University, College Station, TX, 09/14/00, Invited by Prof. J.L. Junkins.
94. *On the Rigid Rotation Concept in n-Dimensional Spaces*, Invited paper, 3rd International Conference on Non Linear Problems in Aeronautics and Astronautics, ICNPAA-2000, Daytona Beach, FL, 05/11/00.
95. *New Algorithms and Sensors for Attitude Determination*, Aerospace Engineering, Texas A&M University, College Station, TX, 12/07/98, Invited by Prof. J.L. Junkins.
96. *New Algorithms and Sensors for Attitude Determination*, Mathematics, Naval Postgraduate School, Monterey, CA, 11/30/98, Invited by Prof. G. Owen and Prof. B. Neta.

97. *Recently Proposed Sensors and Algorithms for Spacecraft Attitude Determination*, Aerospace and Mechanics Engineering, University of Minnesota, Minneapolis, MN, 07/10/97. Invited by Prof. Y.J. Zhao.
98. *The Moon-Sun and the Earth-Sun Attitude Sensors*, System Sciences Division, Computer Science Corporation, Lanham-Seabrook, MD, 06/13/97. Invited by Dr. D. Oza and Dr. M. Challa.
99. *The Moon-Sun and the Earth-Sun Attitude Sensors*, Flight Dynamics Division, NASA-GSFC, 02/22/97, Invited by Dr. F.L. Markley and Dr. J. Deutschmann.
100. *San Marco Project and Space Research at the University of Rome*, **Plenary lecture**, 4th International Symposium on Automatic Control and Computer Science (SACCS' 93), Iasi (Romania), Oct. 29-30, 1993.

12 Consulting

- *Draper Lab.*, Cambridge, MA. *Pyramid* (Star-ID) and *ESOQ2* (Attitude estimation) algorithms have been adopted by the *Stellar Inertial Compass*, JPL New Millennium Program ST6.
- *MIT Center for Space Research*, Cambridge, MA. *Pyramid* was selected for HETE spacecraft (July 2002) and for HETE2 (Feb. 2004). *Pyramid* has been licensed to Star Vision Technologies.
- *European Space Agency* (ESA-ESTEC), Noordwijk, The Netherlands. Advanced Concepts Division of ESA-ESTEC funded **35K Euros** research grant to Tor Vergata University (Rome, Italy) for *Studies on Theory and Applications of Flower Constellations*. Dr. Mortari was external consultant.
- Italian *Ministry of Education, University and Research* (MIUR) within the Italian Programme named "An Incentive for the Process of Internationalization of the University System" funded the proposal *Advanced Satellite Applications on Communications and Navigation based on Flower Constellations* by M. Ruggieri (Tor Vergata University) and A. Ercoli-Finzi (Polytechnic of Milan). That Program is specifically aimed to provide support to scientific and teaching initiatives between Italian and foreign Universities. The proposal includes **4.5K Euros** travel funds for Dr. Mortari.
- Italian Space Agency funded the proposal *FLORAD: Micro-satellite FLOwer Constellation of Millimeter-Wave RADiometers for Earth and Space Observation at Regional Scale*, by Prof. F.S. Marzano (University of Rome) in collaboration with Thales-Alenia Space et Al. 03/15/05-09/14/05, Total amount **700K Euros**. Dr. Mortari was external consultant.
- Space Micro Inc., San Diego, CA. *Software Development for Gymballed Star Tracker with rolling shutter*. May 2015.
- Space Micro Inc., San Diego, CA. *Pyramid Star-ID*, *Recursive Star-ID*, and *Non-dimensional Star-ID*. August 2018.

13 University Service

- Letter Of Intent between the department of Aerospace Engineering of Texas A&M and INPE (Instituto de Pesquisas Espaciais), the Brasilian NASA (National Institute for Space Research)
- Dynamics and Control Search Recruiting Committee, Aerospace Engineering, Texas A&M University. Since Sept. 2003.
- Organized 9 seminar for AERO-681 Seminar Series by inviting external speakers, Texas A&M University.
- Gave 6 seminars on *Space Navigation Systems* for AERO-101 Seminar Series, Texas A&M University.
- New Scholarship Opportunities Committee, Aerospace Engineering, Texas A&M University. August 15, 2005.
- AERO 220/320 Committee, Aerospace Engineering, Texas A&M University. January 2007.
- AERO Math course Committee, Aerospace Engineering, Texas A&M University. October 2007.
- Graduate Affair Committee, Aerospace Engineering, Texas A&M University. January 2009.
- International Affair Committee, Aerospace Engineering, Texas A&M University. February 2011.
- Member (SES) of Strategic Aerospace Research (StAR) Committee, Oct./Nov. 2013.
- Coordinator of Aerospace Engineering Seminar Series. Aug. 2013-2018.
- Member, T&P Committee, 2016.
- Member, AERO-220 Committee, 2016.
- Member, COE Honors and Awards Committee, 2015-2021.

14 External Service

- External Member, Andreis, Eleonora, M.S. Committee, *Deep-Space Autonomous Navigation for Stand-Alone CubeSats*, Space Engineering, Politecnico di Milano (Italy), November 2020.
- Reviewer, NASA Space Technology Research Fellowships (2016, 2017, 2020).
- Member, Steering Board of Ph.D. Program in Aeronautical and Space Engineering, Mechanical and Aerospace Engineering, University of Rome "La Sapienza," Rome (Italy).
- Board member, Engineering Science International Research Councils, RUDN University, Moscow (Russia).
- Editorship:
  - Previous: AAS *The Journal of the Astronautical Sciences*, IEEE *Transactions on Aerospace and Electronic Systems*, *International Journal of Navigation and Observations*, *Frontiers in Aerospace Engineering*, *Theory and Applications of Mathematics & Computer Sciences*.
  - Associated Editor, RUDN *Journal of Engineering Researches*, February 2019-
  - Editor of Special Issue "Computational Mathematics, Algorithms, and Data Processing" (*Mathematics*, 2019), "Attitude Sensors" (*Sensors*, 2020), "Attitude Estimation Based on Data Processing of Sensors" (*Sensors*, 2021).
  - **Editor-in-Chief**, Section "Functional Interpolation" (*Mathematics*, 2021-).

Appendix I: Technical Reports

1. Arduini, C., Ponzi, U., and Mortari, D. *Large Platforms for TLC Platforms*. Phase II-C, December 1984. Preliminary Evaluation of the Flexibility Effects of X, T and H Platforms, ESA contract 4750/81/NL/AK.
2. Arduini, C., Mortari, D., and Ponzi, U. *Large Platforms for TLC Platforms*. Phase II-B, September 1985. Solar Panels. Generation of the Stiffness and Mass Matrices of a Discrete Model, ESA Contract 4750/81/NL/AK.
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Appendix II: Graduate Committee

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2. Marques, Sònia Maria Martinho, MS (External Advisor), *Small Satellites Attitude Determination Methods*, Electric Engineering and Computers, Instituto Superior Tècnico, Technical University of Lisboa (Portugal). May 2001.
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8. Myres, Marilee Ruth, MS non thesis, Aerospace Engineering, Texas A&M University. December 2005.
9. Michael Muzheve, MS non thesis, Mathematics, Texas A&M University. December 2005.
10. Clocchiatti, Alberto, MS (External Advisor), *Responsive Space Surveillance using Periodic Close Encounters*, Aerospace Engineering, Polytechnic of Milan. July 2006.
11. De Santis, Marco, MS (External Advisor), *DwarfSat: un'Applicazione per l'Analisi di Dinamiche Orbitali di Satelliti*, Informatics Engineering, University of Tor Vergata, Roma, December 2006.

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13. Tett, Stuart, MS, *A Scripting Interface for Doubly Linked Face List Based Polygonal Meshes*, Visualization Sciences, Architecture, Texas A&M University. May 2007.
14. Penney, Jonathan David, MS, *A Photon Mapping Based Approach to Computing Celestial Illumination*, Visualization Sciences, Architecture, Texas A&M University. January 2009.
15. Majji, Manoranjan, Ph.D., *System Identification: Nonlinear and Time Varying Methods*, Aerospace Engineering, Texas A&M University. January 2009.
16. Jones-Parish, Julie Marie. Ph.D. Committee, Aerospace Engineering, Texas A&M University. May 2010.
17. Woodbury, Drew, Ph.D. Committee, Aerospace Engineering, Texas A&M University. May 2011.
18. Hellenbrand, Kaitlyn, Ph.D. Committee, Mathematics, Texas A&M University. December 2011.
19. Kogan, Roman, Ph.D. Committee, Mathematics, Texas A&M University. May 2012.
20. Rusek, Korben, Ph.D. Committee, Mathematics, Texas A&M University. May 2013.
21. Andrew Tucker, Ph.D. Committee, Aerospace Engineering, Texas A&M University. May 2014.
22. Nichols, Kristin, MS Committee, Aerospace Engineering, Texas A&M University. May 2015.
23. Conway, Dylan, Ph.D. Committee, Aerospace Engineering, Texas A&M University. March 2016.
24. Alperen, Ergur, Ph.D. Committee, Mathematics, Texas A&M University. May 2016.
25. Kwaakwah, Emma Owusu, MS Committee, Mathematics, Texas A&M University. June 2016.
26. Hogan, Robert D., Ph.D. Committee, Aerospace Engineering, Texas A&M University. August 2017.
27. Franzese, Vittorio, MS Committee ("Controrelatore"), *Autonomous Navigation for Interplanetary Cube-Sats*, Aerospace Engineering, Polytechnic of Milan. September 2017.
28. McHenry, Neil G., Ph.D. Committee, Aerospace Engineering, Texas A&M University, February 2018.
29. Gibson, Joseph, MS Committee, Mathematics, Texas A&M University. February 2019.
30. Watkins, Kristopher, MS Committee, Mathematics, Texas A&M University. October 2019.
31. Zhu, Yuyu. Ph.D. Committee, Mathematics, Texas A&M University. March 2, 2020.
32. Sathyakumar, Jason Stanley, MS Committee, Ocean Engineering, Texas A&M University, July 2020.
33. Coronado, Joan, MS Committee, Mathematics, Texas A&M University. October 2020.
34. Garcia-Buzzi, Pau, Ph.D. Committee, Aerospace Engineering. Texas A&M University, November 2020.
35. Yassopoulos, Chris, MS Committee, Mechanical Engineering, Texas A&M University, November 2020.
36. Goldstein, Joshua, Ph.D. Committee, Mathematics, Texas A&M University. April 2021.

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