João de Teixeira da Encarnação

Résumé

Research Scientist Associate, Center for Space Research, University of Texas at Austin

Personal Information

Full Name:	João Gregório de Teixeira da Encarnação
Birth:	25^{th} of February 1977 at Funchal, Portugal
Nationality:	Portuguese
Address:	Klyuverweg 1 2629 HS, Delft the Netherlands
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Education

2015 **Ph.D. in Space Geodesy**
Geoscience and Remote Sensing (GRS), Delft University of Technology (TU Delft)
Dissertation: *Next-generation satellite gravimetry for measuring mass transport in the Earth system*
Promotor: Prof. Dr-Ing. habil. Roland Klees
Supervisor: Dr. Ir. Pavel Ditmar

2004 **M.Sc. in Aerospace Engineering**
Astrodynamics and Space missions (AS), TU Delft
Final Thesis: *Numerical Simulation of Launch Vehicles*
Supervisor: Prof. Ir. B.A.C. Ambrosius

2000 **Lic. in Aerospace Engineering**
Instituto Superior Técnico (IST), **UTL!** (**UTL!**)
5^{th} year concluded at TU Delft, through the ERASMUS program
Report: *Optimum Aerodynamic Shape for a High Altitude Long Endurance Aerostatic Platform*
Supervisor: Prof. Dr. Ir. Theo van Holten

Academic and Work Experience

Jun. 2018 – present **Research Engineering/Scientist Associate** at Center for Space Research (CSR), University of Texas at Austin (UTexas), USA:

- Refinement of the last gravity field solutions from the Gravity Recovery And Climate Experiment (GRACE) mission;
- Assess signal continuity between GRACE and GRACE-FO;
- GRACE mission-complete reprocessing;
- Time-varying gravity fields estimated from Kinematic Orbits;
- In-house software development in Matlab and Ruby.
- MSc student supervision and mentoring.

Aug. 2016 – May 2018 **Postdoctoral Fellow** at Center for Space Research (CSR), University of Texas at Austin (UTexas), USA:

- Improvements in the calibration of the accelerometers on-board the GRACE satellites, in particular in what relates to temperature effects;
- Determination of the (non-linear) long-term trends in the GRACE gravity field solutions and their prediction during the GRACE/GRACE-FO gap;
- Time-varying gravity fields estimated from Kinematic Orbits;
- In-house software development in Matlab and Ruby.

Sep. 2011 – Jul. 2016 **Research Associate** at Astrodynamics and Space missions, TU Delft, the Netherlands:

- Calibration of the accelerometers on-board the Swarm satellites;
- Improvements in the modelling of non-conservative forces acting on satellites;
- Exploiting Digital Signal Processing (DSP) techniques to merge the measurement of non-gravitational accelerations from different sources: GPS-driven and accelerometer non-gravitational observations;
- Time-varying gravity fields estimated from Kinematic Orbits;
- Research project: Assessment of Satellite Constellations for Monitoring the Variations in Earth's Gravity Field;
- Research project: GOCE+ Theme3: Air density and wind retrieval using Gravity field and steady-state Ocean Circulation Explorer (GOCE) data;
- Research project: Development of the Swarm Level 2 Algorithms and Associated Level 2 Processing Facility;
- In-house software development in Fortran, Matlab and Ruby;
- Student supervision and mentoring.

Jan. 2007 – Dec. 2015 **PhD Candidate** at GRS, TU Delft, the Netherlands:

- Simulation of future gravimetric satellite missions and noise budget of low-low satellite-to-satellite tracking gravimetric data;
- Impact of orbit position modelling errors in the quality of satellite gravimetric data;
- Retrieval of the high-frequency time-variable gravity field of the Earth with numerous satellites;
- Research project: Assessment of a Next Generation Gravity Mission for Monitoring the Variations of Earth's Gravity Field;
- Research project: Monitoring and Modelling Individual Sources of Mass Distribution and Transport in the Earth System by Means of Satellites;
- In-house software development in Fortran and Matlab;
- Student supervision and mentoring.

Apr. 2005 – Nov. 2006 **Stress Engineer** at Global Technics, Leiden, the Netherlands:

- Automated design (for weight and stress minimization) of fuselage panels for the Airbus A380 aircraft (in-house implementation of a tool in C++);
- Trainees supervision and mentoring.

Oct. 2004 – Jan. 2005 **Aerospace Engineer** at Delta-Utec, Leiden, the Netherlands:

- Contractor Work: Implementation of a Sub-Orbital Optimization Module into the Simulation Tool *COLVET* (developed in-house at TU Delft).

Mar. 2004 – Apr. 2004 **Trainee** at the Prins Maurits Laboratorium, TNO, the Netherlands
Supervisor: Ir. Berry Sanders, Rocket Technology Research Group:

- Implementation of the Launch Vehicle Simulation and Optimisation Tool *COLVET*;
- Numerical Simulations on Laser Propulsion (appendix of MSc thesis);
- Collaboration with international colleagues (PT and NL) on a European Space Agency (ESA)-funded project to determine the feasibility of Laser Propulsion.

Sep. 2001 – Dec. 2001 **Trainee** at European Space Research and Technology Centre (ESTEC), ESA, Noordwijk, the Netherlands
Supervisor: Prof. Wubbo Ockels:

- Collaboration with fellow MSc colleagues on a space mission design project: *Lunar Exploration with Ariane 5*;
- Simulation of rocket ascent trajectories (implemented a 2D orbit integrator in Matlab);
- Optimization or rocket trajectories, thrust and attitude program, fuel consumption and payload;
- Preliminary lunar mission design.

Awards

2017 H2020 Marie Skłodowska-Curie Individual Fellowship Seal of Excellent to the proposal on *Direct Gravimetric data assimilation into Geophysical models*

Invited Presentations

2017 **Teixeira da Encarnação, J.**, "Satellite Gravimetry". In: *Summer School On Data Assimilation and its Applications In Oceanography, Hydrology, Risk, Safety And Reservoir Engineering*. Sibiu, Romania.

2015 **Teixeira da Encarnação, J.**, Arnold, D., Bezdek, A., Dahle, C., Doornbos, E., Ijssel, J. V. D., Jäggi, A., Mayergürr, T., Sebera, J., Visser, P., Zehentner, N., "First monthly gravity field solutions derived from GPS orbits of Swarm". In: *AGU Fall Meeting*. San Francisco, CA, USA: 14-18 Dec.

Collaborations

2015 – present International collaboration with Prof. Torsten Mayer-Gürr of the Institute of Geodesy (IfG) of the Graz University of Technology (TUG), Dr. Aleš Bezděk of the ASU of the Czech Academy of Sciences (AVCR), Prof. Adrian Jäggi of the Astronomical Institute of the University of Bern (AIUB), Prof. Pieter Visser of the Aerospace Faculty of the TU Delft and Prof. C.K. Shum of the School of Earth Science (SES) of the Ohio State University (OSU) for the **study of the time-variable gravity field of the Earth estimated from GPS data collected by the Swarm Satellite mission**. These activities have started before we were awarded the funding ITT posted by the ESA-funded DISC consortium and let to one journal publication in *Advances in Space Research* and yearly contribution to the EGU General Assembly.

2014 – present Collaboration with TU Delft on the DopTrack project, consisting of a **satellite tracking radio station that exploits the Doppler effect**; co-initiated and promoted the project, secured departmental funding, selected and assembled the hardware, developed software, engaged students and mentored practical undergraduate projects.

Research Projects

2020 – 2023 uPGRADE - Miniaturized Prototype for GRavity field Assessment using Distributed Earth-orbiting assets (Funding opportunity: AAC 04/SI/2019, project nr: 45927)

2019 – 2020 Multi-approach gravity field models from Swarm GPS data, transfer to operation of production of EGF_SHA_2_ products (DISC contract SW-CO-DTU-GS-111, part of ESA contract 4000109587/13/I-NB)

2017 – 2019 Multi-approach gravity field models from Swarm GPS data (DISC contract SW-CN-DTU-GS-027, part of ESA contract 4000109587/13/I-NB)

2016 – 2019 gravity Recovery And Climate Experiment (GRACE) Two-year Mission Extension (NASA contract NNL14AA00C)

2013 – 2015 Assessment of Satellite Constellations for Monitoring the Variations in Earth's Gravity Field (ESA contract 4000108663/13/NL/MV)

2013	GOCE+ Theme3: Air density and wind retrieval using GOCE data (ESA contract 400010284/11/NL/EL)
2011 – 2016	Development of the Swarm Level 2 Algorithms and Associated Level 2 Processing Facility (ESA Contract 4000102140/10/NL/JA)
2010	Assessment of a Next Generation Gravity Mission for Monitoring the Variations of Earth's Gravity Field (ESTEC contract 22643/09/NL/AF)
2008	Monitoring and Modelling Individual Sources of Mass Distribution and Transport in the Earth System by Means of Satellites (ESA contract 20403)

Service to Profession

Reviewer for scientific papers submitted to *Advances in Space Research*, *Annales Geophysicae*, *Journal of Geodesy*, *Communications in Nonlinear Science and Numerical Simulation*, *IEEE Geoscience and Remote Sensing Letters*, *International Association of Geodesy Symposia*, *Journal of Geophysical Research: Solid Earth*, *Remote Sensing*, *Sensors* and *Solid Earth*, cf. Publons

Extra Training

2017	Dealing with Difficult People, Jeff Stellmach, UTexas
2017	Conflict Management Foundations, Kimberly Sullivan, UTexas
2017	Leading without formal authority, Emil Kresl, UTexas
2017	Meeting effectiveness, Emil Kresl, UTexas
2015	Scientific Writing, Sören Johnson, TU Delft
1993	Certificate of Proficiency in English
1993	Radio Amateur, call sign CT3IU, class B

Languages

	Speaking	Reading	Writing
Portuguese		(mother tongue)	
English	excellent	excellent	excellent
Spanish	good	good	fair
Italian	good	good	fair
Dutch	fair	fair	limited
French	fair	fair	limited

Professional Memberships

since 2012	American Geophysical Union
since 2016	European Geosciences Union