

Ahmed E. S. NOSSEIR, *Dott. Mag.* (PhD Student)

(Green Rocket Propulsion, Space Systems, Additive Manufacturing, Sensors)

Aerospace & Astronautics Engineering, MSc.

Engineering & Materials Science/Mechatronics, BSc. Eng.

EDUCATION

Nov 2022 – Oct 2025	(PhD) University of Trento (conjunct) Scuola Superiore Sant’Anna di Pisa Italian National PhD Program in Space Science and Technology. Operational site in the Institute of Mechanical Intelligence at the Scuola Superiore Sant’Anna di Pisa and conjunctly affiliated to University of Trento, Department of Physics.	Italy
Oct 2017 – April 2022	Università di Pisa – MSc. in Aerospace Engineering (Distinction/Honors) Aerospace & Astronautics Engineering Master’s Program – Space Engineering Curriculum. Final Grade (110/110 Cum Laude). Thesis: Green Chemical Propulsion with Electric Pump Feed Cycle for Small-Sized Spacecraft	Pisa, Italy
Feb 2020 – Aug 2021	Technische Universiteit Delft (TU Delft) – Exchange Student Winner of Erasmus+ 2020/2021 Study & Research Exchange. Thesis research in the Faculty of Aerospace Engineering – Department of Space Engineering Supervised by Prof Angelo Cervone (TU Delft) and Prof Angelo Pasini (UniPi)	Delft, Netherlands
Class of Feb 2015	German University in Cairo – BSc. in Engineering & Materials Science – Specialization in Mechatronic Systems Engineering (5 Years Extended Cycle degree) Overall Grade C – Thesis Grade A. (Registered at the Egyptian Syndicate of Engineers since April 2015; Mechanical/Mechatronics)	Cairo, Egypt & Berlin, Germany

EXPERIENCES

February 2024 – July 2024 Germany	Technical University of Munich (TUM) Chair of Space Propulsion & Mobility + Chair of Carbon Composites – PhD Exchange / Visiting Scientist Experimental Research exchange period in TUM. Prototyping of composite pressure vessels (Smart Propellant Tanks) for advanced propulsion of intelligent spacecraft and launchers. Supporting WARR Rocketry students' team with technical work related to propellant tanks design and prototyping / Supporting LEVITUM Students' Association with AM of composites parts for E-VTOL prototypes.
May 2023 – May 2026 ITALY	Subject Matter Expert Rocket Propulsion (cultore della materia) – University of Pisa Qualified for teaching and for the inclusion in the examination committee in the subjects of Rocket Propulsion and Fluid Dynamics in the program of Aerospace Engineering under the Department of Civil and Industrial Engineering of the University of Pisa.
2023 – Present USA (Remote)	Judge in NSS Gerard K. O’Neill Space Settlement Contest – USA Participating as a Judge in the American National Space Society annual Gerard K. O’Neill Space Settlement Contest for high-school students
Nov 2022 – Present Pisa, ITALY.	Doctoral Student – Italian National PhD in Space Science and Technology (DIN SST) Main PhD research theme is the design and development of integrated optical fiber sensor systems for space applications and the operations and condition monitoring of launch vehicles and spacecraft intelligent propulsion systems. Operational Site – Scuola Superiore Sant’Anna – Pisa (Institute of Mechanical Intelligence): Involved in Industrial & Academic Collaborations; (Partecipazione ad attività di ingegneria aerospaziale al progetto " Compositesensing: per l'integrazione di sensori diagnostici in composite avanzate", finanziato dal Ministero della Difesa.)

Administrative Site – University of Trento:

Elected PhD Students' Representative of DN SST 2022 – 2024; Member Collegio. Assigned Auditor at the Council of the Department of Physics UniTn 2022 – 2023. Member Executive Board "Consulta dei dottorandi e degli assegnisti di ricerca 2022/2023"

August 2022 –
January 2023
(Waivered Nov 2022
for the PhD
scholarship)
ITALY

Research Fellowship R&D Engineer (Borsista) – Propulsion Systems – UniPi DICI

Involved in Test Facility construction, procurements, & integration, and **experimental characterization of chemical propulsion systems critical components**. Working in the chemical propulsion test facility on testing propulsion components for CubeSats systems burning **hydrogen peroxide** as well as launch vehicle propulsion burning **LCH4**. The position involves technical documentation and research papers writing. The activities took place within **BART project funded by the European Space Agency (ESA)**.

March 2022 –
May 2022
Hybrid
NETHERLANDS

Research Engineer – R&D Office A & Angels Space Propulsion B.V.

(Internship) A & Angels (www.aangels.space) is a Dutch aerospace design start-up company based in Den Haag, South Holland that designs green propulsion systems and components. I worked as an **R&D Research Engineer** in the **analysis, design, and simulation of spacecraft green propulsion**; and assisted in **Grant Proposal writing** besides the **Market Survey activities** and **International Procurement and import communications**.

October 2021 –
March 2022
GERMANY

Teaching Assistant/Assistant Lecturer (75hrs) – Faculty of Engineering – GIU Berlin

Holding a **full-time Teaching Assistant position (Academic Staff)** at the German International University – GIU in Berlin for the **Winter Semester 2021**. Departments of **Electrical Engineering and Mechanical Engineering**. Assisting lecturer and carrying out teaching activities in Tutorial and Laboratory within **four courses (75 hours teaching per semester)**:

1. Control Systems for Mechatronics Engineers (Prof. Klaus Leimbach – Uni Heilbronn)
2. Modelling & Control of Renewable Energy Systems (Prof. M. Ibrahim – Uni Heilbronn)
3. Machine Elements (Dr. Harraz GIU Berlin)
4. CAD & Technical Drawing (Dr. Harraz GIU Berlin)

(Tutorials & Labs teaching loads – Exams/quizzes preparation and Examination related work)

August 2021 –
November 2021
ONLINE
USA

Analytic Writer (Freelance) – METACULUS

Metaculus is Data Science and AI backed forecasting platform that uses big data and analytics for events prediction – predicting the timing, nature and impact of scientific and technological advances and breakthroughs. It was founded and currently run by Data scientists and Astrophysicist from University of California Santa Cruz, and the company is based in CA, USA. My duty lies in **writing data backed analytical scientific essays, providing qualitative, quantitative, and statistical analysis for different assigned subjects and topics in a given field of interest**. Currently I'm working on the fields of "Green Rocket Science and Space Technology" and on "Geopolitics in Africa, Arabia and Mediterranean Nations." **(Writer name: anosseir)**

August 2015 –
June 2017
EGYPT

Lab Engineer & Research Assistant – German University in Cairo

{Materials Science Testing Lab}

Held a **full-time position as Lab Engineer, Instructor & Supervisor of students and technicians, and Research Assistant**. Instructed experimentation design and tests evaluation and provided Testing Machines training for students. Carried out outsourced industrial R&D Tests (Mechanical and Metallography Testing; Destructive and Non-Destructive Testing, Microstructure Optical Microscopy). Mechanical Testing Machines used **(Zwick/Roell 100 – Universal Testing Machine)** and **(Z/R HA 500 – Fatigue Machine.)**

June 2016 –
June 2017

{Control & Dynamical Systems Lab – Aerial Robotics Research Group}

Held a **Research Assistant position & co-supervisor for 10 B.Sc. students' thesis projects**. Worked on the **modelling, simulation, & development of quadrotor autonomous research platforms to demonstrate system stability and response** with different control techniques while performing 3d-mapping and position control.

September 2013
– August 2014
EGYPT

Undergrad and Postgrad Research Assistant – MNRLab – GUC

I was involved in the design, development, and fabrication of Mechanical & Mechatronics Systems for the lab's diverse applications, along with mentoring **4 students with their B.Sc. thesis projects**. I had experience in **systems modelling and simulation and rapid prototyping and components manufacturing using (DMU 70 5-axes – Milling Machine)** and **systems' production in the university's Industrial Park GUC–**

September 2015 – June 2016
 DMG MORI. I had experience in test bench development for micro fluid flow and manipulation of magnetic field (using myRIO, myDAQ, and basic electronics lab components). I had experience in using Laser Interferometer WB for components accuracy verification.

EXTRACURRICULAR ACTIVITIES

Nov 2022 – Nov 2024	Collegio dei docenti – DIN Space Science and Technology / Consiglio Dipt. Fisica / International Astronautical Federation	Phd Students' Representative
January 2015 – June 2017	IEEE RAS GUC Students' Chapter https://ieeerasguc.weebly.com/ https://facebook.com/RAS.GUC/	Co-founder & Students' Research Group Supervisor
June 2015	Environmental Monitoring (Voluntary Work) at Wadi El Gemal – Hamata National Parks – Ministry of Environment. Marsa Aillam, Red Sea, South Egypt (إدارة محميات جنوب البحر الأحمر (وادي الجمال - مرسى علم)	Marine Underwater (Scuba Diving) Research Activities

COMPUTER SKILLS

- ◆ CADWIND Composites Simulation
- ◆ SolidWorks (advanced)
- ◆ Autodesk inventor / AutoCAD (advanced)
- ◆ ProE (Creo) (previously experienced)
- ◆ MATLAB / Simulink (advanced)
- ◆ LabView: Real-time & FPGA Modules (previously advanced)
- ◆ ANSYS Structural Analysis FEA (advanced)
- ◆ RPA – Rocket Propulsion Analysis (advanced)
- ◆ Java – C# – C++ – Python
- ◆ ROS – Robot Operating System (previously advanced)
- ◆ GAZEBO Simulator (previously advanced)
- ◆ PCB design software. PSPICE - Proteus – Fritzing (previously advanced)
- ◆ PLC Programming: Siemens Simatic Manager (FluidSIM Pneumatic - Hydraulic) (previously advanced)
- ◆ Linux (Ubuntu) user
- ◆ Bash/Shell Script programming
- ◆ Microsoft Visio - Project

LANGUAGES

English – *Advanced* (Spoken & Written)

- ◆ AS (English & Academic Skills)
- ◆ SM (Research & Scientific Methods)
- ◆ CPS (Communication & Presentation skills)
- ◆ RPW (Research Paper Writing)
- ◆ IELTS – overall grade (C1 - 7.0)
- ◆ OLS EU (C1)

Arabic – Native Speaker

Deutsch – Level A2, refer to Apx.2.3. (Currently very limited.)

Italiano – Level A2

HOBBIES

Equestrian – Showjumping (competing in D & C Levels – up to 1.2-1.3m); 2004 - 2016.

Scuba Diving – (PADI licences holder: Open Water; Advanced O.W.; **Rescue Diver**) - since 2011.

Sailing – (leisure) Laser Standard & Catamaran F14/F17 (*Federazione Italiana Vela, FIV*)

Music – Basic music theory - Blues Electric Guitar (beginner/intermediate - band)

REFERENCES

Prof. Assoc. Angelo Cervone, TU Delft

Prof. Dr. Eng. Swen Zaremba, TUM

Prof. Dr. Eng. Yasser Higazi, GUC

Prof. Ahmed Abdelaziz, GUC

Prof. Klaus-D. Leimbach, Uni Heilbronn/GIU

Prof. M. Ibrahim, Uni Heilbronn/GIU

Prof. Luca D'Agostino, UniPi

Prof. Roberto Battiston, UniTn

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List of Publications:

1. Nousseir, A.E.S.; Pasini, A.; Cervone, A. **Modular Impulsive Green-Monopropellant Propulsion System For Micro/Nano Satellites High-Thrust Orbital Maneuvers (MIMPS-G)**. In Proceedings of the 71st International Astronautical Congress, CyberSpace Edition, 12-14 October 2020. <https://iaaastro.directory/iac/browse/IAC-20/91/5A-C4.8/> (Speaker)
2. Nousseir, A.E.S.; Cervone, A.; Pasini, A. "Review of State-of-the-Art Green Monopropellants: For Propulsion Systems Analysts and Designers." *Aerospace* 2021, 8(1), 20. <https://doi.org/10.3390/aerospace8010020> [Top 10 Cited in Aerospace MDPI 2022 & 2023]
3. Nousseir, A.E.S.; Cervone, A.; Pasini, A. "Modular Impulsive Green Monopropellant Propulsion System (MIMPS-G): For CubeSats in LEO and to the Moon." *Aerospace* 2021, 8(6), 169. <https://doi.org/10.3390/aerospace8060169> (Design for Additive Manufacturing)
4. Nousseir, A.E.S.; Pasini, A.; Cervone, A. "A Survey on Energetic Ionic Liquid Green Monopropellants and Investigation of Feed and Pressurization System for Small Satellites High-Thrust Impulsive Propulsion." In Proceedings of the 7th Space Propulsion Conference, SP2020_00312, Virtual Event, 17-19 March 2021. (Speaker)
5. Nousseir, A.E.S.; Cervone, A.; Pasini, A. "Modular Impulsive Green Monopropellant Propulsion System (MIMPS-G): System Analysis and Preliminary Design." In Proceedings of the 7th Space Propulsion Conference, SP2020_00311, Virtual Event, 17-19 March 2021. (Speaker)
6. Nousseir, A.E.S.; Pasini, A.; Cervone, A. "Green Monopropellants." *Encyclopedia*, 2021. Available online: <https://encyclopedia.pub/7693>
7. Nousseir, A.E.S.; Pasini, A.; Igarashi, S.; Matsuura, Y.; Cervone, A. "CubeSat Green Propellants AM Tanks: Efficient Designs, Propellant Management, and Chemical Compatibility." In Proceedings of the 8th Space Propulsion Conference, SP2022_221, Estoril, Portugal, 9-13 May 2022. (Speaker)
8. Nousseir, Ahmed E. S.; Cervone, Angelo; Pasini, Angelo; Igarashi, Shinji; Matsuura, Yoshiki, "Additively Manufactured Green Propellant Tanks: Volume Efficient Designs and Materials Chemical Compatibility" in INTERNATIONAL JOURNAL OF ENERGETIC MATERIALS AND CHEMICAL PROPULSION, v. 2023, DOI: 10.1615/IntJEnergeticMaterialsChemProp.2023047165
9. Nousseir, A.E.S., Cervone, A., Slejko, E.A., Oton, C., Di Pasquale, F., Faralli, S. "Carbon Composite Structures with Embedded Fiber Optic Sensors: A Smart Propellant Tank for Future Spacecraft and Launchers" In Proceedings of the 74th International Astronautical Congress, Baku, 2-6 October 2023. (Speaker)
10. Nousseir, A.E.S., Oton, C., Cervone, A., Muanenda, Y., Di Pasquale, F., "A Review on Photonic Sensing Systems for Spacecraft Applications" In Proceedings of the 74th International Astronautical Congress, Baku, 2-6 October 2023. (Speaker)
11. Nousseir, A.E.S. and Cervone, A., 2024, "Feed and Pressurization Systems and Architectures for Green Chemical Micro-Propulsion", in Recent Advancements In Green Propulsion: Green Propellants for Micropropulsion Systems, edited by Rachid Amrousse & Qi-long Yan, Springer. (book chapter)
12. Nousseir, A.E.S., Cervone, A., Amrousse, R., Pasini, A., Igarashi, S., Matsuura, Y., 2024, "Green Monopropellants: State-of-the-Art", in Recent Advancements in Green Propulsion: Green Propellants for Micropropulsion Systems, edited by Rachid Amrousse & Qi-long Yan, Springer. (book chapter)
13. Nousseir, Ahmed E. S.; Slejko, Emanuele Alberto; Cervone, Angelo; Oton, Claudio J.; Di Pasquale, Fabrizio, "Composite structures with embedded fiber optic sensors: A smart propellant tank for future spacecraft applications" in ACTA ASTRONAUTICA, v. 223, (2024), p. 144-158. - DOI: 10.1016/j.actaastro.2024.06.040 [Q1 SCIMAGO]
14. Nousseir, Ahmed E. S.; Cervone, Angelo; Manfretti, Chiara; Slejko, Emanuele A.; et al., "DESIGN AND PROTOTYPING OF A SMART PROPELLANT TANK FOR SPACECRAFT" in Proceedings of the 75th International Astronautical Congress (IAC 2024), Milano, Italia: International Astronautical Federation (IAF), 2024. Atti di: International Astronautical Congress (IAC), Milano, Italia, 14-18 October 2024 (Speaker) (Additive Manufacturing; Carbon Composites; Smart Structures)
15. L.E. Ghezzer, G. Giovanazzi, A.E.S. Nousseir, F. Nozzoli*, L. Ricci, F. Rossi, P. Spinnato, E. Verroi, P. Zuccon, F. Bruni, F. Meinardi "Prototyping a Pressurized Helium Scintillating Calorimeter for AntiMatter Identification" in publication on: Cent. Eur. Astrophys. Bull. (2024) 48:7 ISSN: 2706-3232 (Advanced Manufacturing of spacecraft instrumentation)
16. Hairch, Youssef; Nousseir, Ahmed E. S.; Atamanov, Meirani; Amrousse, Rachid, "Cellular Ceramics Used as Catalytic Supports for Heterogeneous Catalyst Synthesis" in Innovative Materials for Industrial Applications, Pennsylvania, United States: IGI Global, 2025, p. 1-38. - ISBN: 9798369375051. - DOI: 10.4018/979-8-3693-7505-1.ch001 (book chapter – contributed subsections about SLA AM of lattice structures for catalyst supports in micro thrusters)
17. Remissa, Imane; Nousseir, Ahmed E. S.; Tiwari, Amit; Bachar, Ahmed; Mabrouk, Assia; Amrousse, Rachid, "Lab-Scale Thermal Decomposition of Hydrogen Peroxide as Green Propellant over Low-Cost Catalysts Based on Copper Deposited on Different Supports" in AEROSPACE, v. 2025, 12, n. 5.440 (2025). - URL: <https://www.mdpi.com/2226-4310/12/5/440>. - DOI: 10.3390/aerospace12050440
18. Kasbi, Youssef; Remissa, Imane; Toshtay, Kainaubek; Mabrouk, Assia; Bachar, Ahmed; Azat, Seitkhan; Nousseir, Ahmed E. S.; Tiwari, Amit; Mouloudi Sabbar, El; Amrousse, Rachid, "H2O2 and HAN Green Monopropellants—A State-of-the-Art Review on Their Recent Development, Corresponding Synthesized Catalysts, and Their Possible Use as Thrusters" in CATALYSTS, v. 15, n. 2 (2025). - URL: <https://www.mdpi.com/2073-4344/15/2/183>. - DOI: 10.3390/catal15020183
19. A. E. S. Nousseir, S. Zaremba, E. A. Slejko, A. Cervone, F. Di Pasquale, and C. J. Oton "OFS-embedded smart composites: OFDR distributed sensing for structural condition and operation monitoring in spacecraft propellant tank", Proc. SPIE 13639, 29th International Conference on Optical Fiber Sensors, 1363984 (22 May 2025); <https://doi.org/10.1117/12.3073154> Invited Oral Presentation – Post-Deadline Paper (Topic: Sensor embedded smart space structures)

Google Scholar:

<https://scholar.google.com/citations?user=wkgqP4AAAA&hl=it&oi=ao>

ORCID:

<https://orcid.org/0000-0001-6259-0956>

My UniTN:

<https://webapps.unitn.it/du/it/Persona/PER0255605/Pubblicazioni>

Awards:

- Erasmus+ competition winner (TU Delft) (2020).
- Medaglia Laureati Cum Laude – Università di Pisa (2022)
- Emerging Space Leader Grant (ESL 2023) – International Astronautical Federation.
- Space Generation Advisory Council – SGC 2023 ESL delegates Award.
- StartUp Lab Best semi-finalists Award – School of Innovation (UniTrento) (2023).

Theses co-supervisor (corelatore):

BSc (Mechatronics Engineering):

- 10 BSc Thesis Students in the Control and Dynamical Systems Lab – GUC (2016/2017)
- 4 BSc Thesis Students in the MNR Lab – GUC (2014/2015)

MSc (Tesi di Laurea Magistrale – Ing. Aerospaziale e Astronautica):

- etd-01262023-114259 – S. Urbani – Feb. 2023 – UniPi
- etd-11042022-121424 – A. Novi – Nov. 2022 – UniPi



Sant'Anna



PhD SST
Space Science
and Technology

