

Prof. Ing. Alessandro A. Golkar, PhD
Skolkovo Institute of Science and Technology
100 Novaya Ulitsa, Skolkovo, Odintsovski District, Moscow Region, 143025 Russia
mobile +7-919-969-4221, golkar@skolkovotech.ru, citizenship: Italian

Dr. Alessandro Golkar is Assistant Professor the Skolkovo Institute of Science and Technology (Skoltech) in Moscow, Russian Federation, a private university opened in collaboration with MIT. He received a Ph.D. in Aeronautics and Astronautics from MIT in 2012. He is the Director of the Strategic Innovation Research Group (SIRG) at Skoltech. His research interests lie in the areas of systems architecture, project management, systems engineering, and spacecraft design analysis and optimization.

He is author of 35 publications, including 10 peer-reviewed journal papers, and is a reviewer for the AIAA Journal of Spacecraft and Rockets, INCOSE Systems Engineering Journal, and the IEEE Transactions on Aerospace and Electronic Systems.

CURRENT POSITION

2012 – Present **SKOLKOVO INSTITUTE OF SCIENCE AND TECHNOLOGY** **Moscow, Russia**
Assistant Professor

Primary activities

1. Leading Skoltech's Strategic Innovation Research Group (SIRG). Advising graduate students at Skoltech and MIT in research and entrepreneurship projects.
2. Leading the development of Skoltech's Concurrent Engineering Design Laboratory (CEDL).

Other activities

3. Chair, Skoltech degree requirements subcommittee
4. Member, Skoltech Space Advisory and Working Committee for the Space Curriculum, and Space Students Admissions process. Lead and budget owner of the Concurrent Engineering Design Laboratory.
5. Member, Skoltech Faculty Committee on Policy; reviewing policies on University Governance.
6. Contributor to the Formulation of the Strategy of Skoltech's Space Center for Research, Education, and Innovation (CREI). Supporter of the development of Skoltech's Space CREI.
7. Involved in the development of the Space graduate curriculum at Skolkovo Tech. Research Interests: Systems Architecture for Large-Scale Infrastructures; Space Systems, Small Satellite Technology.

OTHER CURRENT POSITIONS

2012 – current **MASSACHUSETTS INSTITUTE OF TECHNOLOGY** **Cambridge, MA**
Visiting Professor, Department of Aeronautics and Astronautics

2014 - current **MOSCOW INSTITUTE OF PHYSICS AND TECHNOLOGY** **Moscow, Russia**
Professor, Satellite Engineering

2013 - current **UNIVERSITA' DI ROMA "LA SAPIENZA"** **Rome, Italy**
Visiting Faculty Instructor and Advisor in Sapienza Master Course in Satellites and Orbiting Platforms

EDUCATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY Cambridge, MA

Doctor of Philosophy (Ph.D. Degree) in Aeronautics and Astronautics
Major: Systems Architecture Minor: Planetary Science

UNIVERSITY OF ROME "LA SAPIENZA" Rome, Italy

Master's Degree in Astronautical Engineering

UNIVERSITY OF ROME "LA SAPIENZA" Rome, Italy

Bachelor's Degree in Aerospace Engineering

WORK EXPERIENCE

2012 – Present SKOLKOVO INSTITUTE OF SCIENCE AND TECHNOLOGY Moscow, Russia
Assistant Professor

April 2013 UNIVERSITA' DI ROMA "TOR VERGATA" Rome, Italy
Guest Faculty Instructor in Tor Vergata Master Course in Systems Engineering

2012 – 2013 EUROPEAN SPACE AGENCY Frascati, Italy
Consultant to the Earth Observation Department (EOP-E) – GMES Space Component Office

2011 – 2012 NASA EXPLORATION SYSTEMS MISSIONS DIRECTORATE (with MIT)
Comprehensive Architecting of Human Space Exploration Transportation Infrastructures

2011 NASA/CALTECH JET PROPULSION LABORATORY
NASA Graduate Fellow – Mars Sample Return Campaign

2009 – 2011 NASA EXPLORATION SYSTEMS MISSIONS DIRECTORATE
(Graduate Student Assistantship at MIT)
Systems Architecting of Human Space Exploration Missions

- MIT Super Heavy Lift Launch Vehicles Study Lead - NASA HQ-ESMD SLS Conceptual Studies.
- NASA Human Spaceflight Plans Review Committee (Augustine Committee). Systems Engineering Studies for Committee Member Prof. Ed Crawley. Developed recommendations for US Augustine Report.

2009 – 2010 BP plc (Graduate Student Assistantship at MIT)
Offshore Oil and Gas Production Platforms Systems Architecting

OTHER PROFESSIONAL EXPERIENCE

ESA – ESTEC Noordwijk, NL
Intern, Concurrent Design Facility

SWEDISH SPACE CORPORATION Kiruna, Sweden
AURORA Team Leader, BEXUS-7 Stratospheric Balloon Launch Campaign

ESA – ESRIN Frascati, IT
Intern, Vega Programme Department

INVITED TALKS AND SEMINARS

Sofia University, Sofia Bulgaria, "What is Systems Architecture?", November 2014

Space Challenges, Sofia Bulgaria, "Space Systems Architecture and Systems Engineering", November 2014

Skolkovo Institute of Science and Technology, "*Architecting Skoltech's Systems Engineering Course: Active Learning and CDIO Principles at use*", CDIO Academy Russia, September 2014.

European Commission 3rd Space Research Conference & Horizon 2020 Space Info Day, "Opportunities for Innovation in European Space: The Federated Satellite Systems (FSS) paradigm", Competitiveness for European Space Technology Workshop, September 2014.

Skolkovo Institute of Science and Technology, "*Space Engineering – Landscape Lecture*", Innovation Workshop, July 2014.

Delft University of Technology, "*Federated Satellite Systems (FSS): A novel distributed satellite system concept*", International Workshop of Fractionated Spacecraft (IWFS), June 2014.

Italian Space Agency, Rome Italy, "Systems engineering and systems architecture for the formulation and evaluation of space missions and industrial development strategies: an international perspective", October 2013

Startup Village, Skolkovo, "Innovations: Choosing the Right Problem and Moving the Solution from University to Company to Market", May 2013

Moscow Aviation Institute, "Federated Satellite Systems (FSS): An Innovation in Space Systems Design", April 2013

Space Research Institute of Russian Academy of Sciences (IKI), "Innovative Small Satellite Mission Concepts", April 2013

Skolkovo Institute of Science and Technology, "Small Satellites and Space Systems Architecting Research at Skolkovo Tech: Overview", April 2013

Massachusetts Institute of Technology, "Systems Architecture under Ambiguity: Framework and Case Studies", June 2012

Georgia Institute of Technology, "Delphi-Structured Architecting Framework for Comprehensive Analysis of Space Systems", November 2011

Massachusetts Institute of Technology, ESD.34 Systems Architecture Class, "Heavy Lift Launch Vehicle Systems Architecting", October 2011

Caltech Jet Propulsion Laboratory, "A Framework for Systems Architecting Under Ambiguous Stakeholder Objectives: An Application to Mars Sample Return", August 2011

University of Rome "La Sapienza", "Strumenti e Metodi per l'Architettura di Sistemi Spaziali: Applicazioni alle Missioni Umane nello Spazio", July 2010

COURSES HELD

Fall 2012, Massachusetts Institute of Technology, 16.851 Satellite Engineering
(co-instructor with Profs. David Miller and Jeff Hoffman)

Spring 2013, Massachusetts institute of Technology, 16.83 Space Systems Engineering
(co-instructor with Prof. Jeffrey Hoffman)

Spring 2013, Massachusetts Institute of Technology, 16.89 Space Systems Architecture
(lead instructor, with Prof. David Miller)

Spring 2013, Università di Roma "La Sapienza", Space Systems Architecture
Master in Satellite Systems and Orbiting Platforms (lead instructor)

Spring 2014, Skolkovo Institute of Science and Technology, Systems Architecture
(lead instructor) – **largest Skoltech course of the term**

Spring 2014, Skolkovo Institute of Science and Technology, Satellite Engineering
(lead instructor)

Spring 2014, Università di Roma “La Sapienza”, Space Systems Architecture
Master in Satellite Systems and Orbiting Platforms (lead instructor)

Spring 2014, Moscow Institute of Physics and Technology, Satellite Engineering
(lead instructor)

Fall 2014, Skolkovo Institute of Science and Technology, (Space) Systems Engineering
(lead instructor)

STUDENTS, STAFF, AND POSTDOCS SUPERVISED

1. Andrew Owens, MIT student (co-supervised with Olivier de Weck)
2. Paul Grogan, MIT student (co-supervised with Olivier de Weck)
3. Marcus Wu, MIT student (co-supervised with Adam Ross)
4. Ben Corbin, MIT student (co-supervised with Sara Seager)
5. Liangzhong Ruan, MIT postdoc (co-supervised with Moe Win)
6. Ignasi Lluch i Cruz, Skoltech student (PhD advisor)
7. Udrivolf Pica, Skoltech student (PhD advisor)
8. Brendan Smith, Skoltech student (PhD advisor)
9. Emanuele Capparelli, Sapienza student (SM thesis advisor and TA supervisor)
10. Anna Dubovik, Skoltech SM student (academic advisor)
11. Mikhail Barannikov, Skoltech SM student (academic advisor)
12. Nikolay Shuiskiy, Skoltech SM student (academic advisor)
13. Ekaterina Kotenko, Skoltech SM student (academic advisor)
14. Alexandra Kudriashova, Skoltech SM student (academic advisor)
15. Sergey Madaminov, Skoltech SM student (research supervisor)
16. Roman Prilepskiy, Skoltech SM student (research supervisor)
17. Olcay Yilmazcoban, Skoltech SM student (research supervisor)
18. Artur Uzbekov, Skoltech SM student (research supervisor)
19. Rustam Akthyamov, Skoltech SM student (research supervisor)

LEADERSHIP AND SERVICE

Committee Member **Skoltech Policy Review Committee (Moscow, Russia) (2014)**

Chair, Organizer	Federated Satellite Systems Workshop (Moscow, Russia) (2014)
Prog. Comm. Member	INCOSE CIISE 2014 (Rome, Italy) (2014)
Tech. Comm. Member	SECESA 2014 (Stuttgart, Germany) (2014)
Session Chair	AIAA 2014 Space Conference (San Diego, CA) (2014)
Member	AIAA Systems Engineering Technical Committee (SETC) (2014-curr.)
Member	AIAA Concurrent Engineering Working Group (CEWG) (2014-curr.)

Reviewer **IEEE Transactions on Aerospace and Electronic Systems**

Reviewer	AIAA Journal of Spacecraft and Rockets
Reviewer	INCOSE Systems Engineering Journal
Committee Member	Systems Engineering Committee of the Italian Board of Registered Engineers (2013-curr.)
Committee Member	International Relations Committee of the Italian Board of Registered Engineers (2009-2012)
Co-Chairman	Notte Tricolore at Boston Symphony Hall Organizing Committee (2600+ attendees)
Team Leader	First Prototype Development of MIT “TALARIS” Lunar Hopper Demonstrator (2009)
President	R&D Outreach Committee of the Rome Castelli Romani Rotaract Club (2008)
Chairman	VII Aerospace Forum promoted by the Rome Castelli Romani Rotary Club (2008)

PROFESSIONAL QUALIFICATIONS

Industrial Engineer	Italian Board of Registered Engineers
Associate Systems Engineering Professional	INCOSE
STK Certified	Analytical Graphics, Inc.

AWARDS

Winner, 2014 Luigi G. Napolitano Award (2014)

"The award has been presented annually since 1993, to a young scientist, below 30 years of age, who has contributed significantly to the advancement of the aerospace science and has given a paper at the International Astronautical Congress on the contribution."

Finalist, ISSNAF Young Investigator Award (2014)

Rising Young Professional Award (2013)
"In recognition of high achievement in Aeronautical Sciences"

Finalist, ISSNAF Young Investigator Award (2012)

Top-3 PhD Research in MIT Aero/Astro Department Research Competition (2012)

JPL Graduate Fellowship (2011)
Mission Systems Concepts, Section 312

F. Botta S.J. Alumni Award (2010)
Best Master's Thesis, Istituto Massimo, Rome (IT)

NASA Certificate of Recognition (2009)
Graduate Mentor for the NASA MUST program

Graduate Research Assistantship, Massachusetts Institute of Technology (2008-2012)

PROFESSIONAL AFFILIATIONS

Member	American Institute of Aeronautics and Astronautics (AIAA)	since 2006
Member	International Council of Systems Engineering (INCOSE)	since 2009
Member	Institute for Operations Research and the Management Sciences	since 2011

ACTIVITIES

Flying	FAA Private Pilot Airplane Single Engine Land
Diving	SSI Open Water Diver
Other	Music, Swimming, Photography

LANGUAGES

Italian	Native language
English	Fluent
Spanish	Fluent
Russian	Beginner
French	Basic comprehension of written French
German	Basic comprehension of written German

PEER-REVIEWED JOURNAL PUBLICATIONS

- [J10] Golkar, A., Lluch, I., “*The Federated Satellite Systems Paradigm: Concept and Business Case Evaluation*”, submitted to Acta Astronautica, October 2014.
- [J9] Lluch, I., Golkar, A., “*Design implications for missions participating in Federated Satellite Systems*”, submitted to AIAA Journal of Spacecraft and Rockets, September 2014.
- [J8] Palermo, G., Golkar, A., Gaudenzi, P., “*Earth Orbiting Support Systems for Commercial Low Earth Orbit Data Relay: Assessing Architectures through Tradespace Exploration*”, submitted to Acta Astronautica, August 2014.
- [J7] Karlow, B., Jewison, C., Sternberg, D., Hall, S., Golkar, A., “*Large Space Telescopes: Tradespace Investigation of Strategic Design Factors*”, submitted to SPIE Journal of Astronomical Telescopes, Instruments, and Systems (JATIS), August 2014.
- [J6] Aliakbargolkar, A., Crawley, E.F., “*A Delphi-Based Framework for systems architecting of in-orbit exploration infrastructure for human exploration beyond Low Earth Orbit*”, Acta Astronautica, Vol.94, Issue 1, pp. 17-33, January-February 2014.
- [J5] Golkar, A., Crawley, E.F., “*Parametric Analysis of Single Stage Earth Departure Stage In-Orbit Refueling*”, AIAA Journal of Spacecraft and Rockets, vol.51, issue 2, pp.631-635, April 2014, doi: 10.2514/1.A32718.
- [J4] Golkar, A., Crawley, E.F., “*A Framework for Space Systems Architecture under Stakeholder Objectives Ambiguity*”, INCOSE Journal of Systems Engineering, submitted, November 2013.
- [J3] Aliakbargolkar, A., Crawley, E.F., “*Mars Sample Return Campaign: Results of Delphi Study for Requirements Formulation*”, AIAA Journal of Spacecraft and Rockets, submitted, December 2013.
- [J2] Aliakbargolkar, A., Crawley E.F., Wicht, A.C., Battat, J.A., Calandrelli, E.D., “*Systems Architecting Methodology for Space Transportation Infrastructure*”, AIAA Journal of Spacecraft and Rockets, Vol.50: 579-590, doi 10.2514/1.A32320, 2013.
- [J1] Aliakbargolkar, A., Crawley E.F., “*Architecting Methodology for Spatially and Temporally Distributed Resource Extraction Systems*”, INCOSE Journal of Systems Engineering, Vol.16 Issue 3, pp.277-286, Autumn 2013.

PEER-REVIEWED CONFERENCE PROCEEDINGS

- [C25] Lluch, I., Pica, U., Grogan, P.T., Golkar, A., “*Simulating a Proactive Ad-Hoc Network Protocol for Federated Satellite Systems*”, submitted to the IEEE Aerospace Conference 2015, Big Sky MT.
- [C24] Smirnov, D., Golkar, A., “*Stirling Engine Systems Tradespace Exploration Model*”, submitted to the 2015 Conference on Systems Engineering Research (CSER 2015), Hoboken NJ.
- [C23] Lluch, I., Golkar, A., “*Satellite-to-Satellite Coverage Optimization Approach for Opportunistic Inter-Satellite Links*”, 2014 IEEE Aerospace Conference, Big Sky (MT), March 2014.
- [C22] Grogan, P.T., Golkar, A., Shirasaka, S., de Weck, O.L., “*Multi-stakeholder interactive simulation for Federated Satellite Systems*”, 2014 IEEE Aerospace Conference, Big Sky (MT), March 2014.
- [C21], Sanchez Net, M., Selva, D., Golkar, A., “*Exploring Classification Algorithms for Early Mission Formulation Cost Estimation*”, 2014 IEEE Aerospace Conference, Big Sky (MT), March 2014.

NON PEER-REVIEWED CONFERENCE PROCEEDINGS

[C20] Shuyskiy, N., Omelianovich, A., Golkar, A., “*A framework for conceptual design of concurrent engineering design facilities*”, to be presented at the 6th International Conference on Systems & Concurrent Engineering for Space Applications (SECESA 2014), October 2014, Stuttgart Germany.

[C19] Golkar, A., “*Concurrent Engineering Design Laboratory: Pioneering Concurrent Engineering in the Russian Federation*”, to be presented at the 6th International Conference on Systems & Concurrent Engineering for Space Applications (SECESA 2014), October 2014, Stuttgart Germany.

[C18] Palermo, G., Golkar, A., Gaudenzi, P., “*An Earth Orbiting Support System for Commercial on-orbit Data Relay*”, to be presented at the 20th Ka and Broadband Communications, Navigation, and Earth Observation, Conference, October 2014, Salerno Italy.

[C17] Alifanov, O., Braun, R.D., Crawley, E.F., Logsdon, J., Zelenyi, L.M., Borowitz, M., Capparelli, E., Davison, P., Golkar, A., Steinfeldt, B., “*Cooperative Scenarios for Human Exploration Beyond Low Earth Orbit*”, 2014 International Astronautical Congress, Toronto Canada, October 2014.

[C16] Golkar, A., “*Design margin utilization in commercial satellite cloud computing systems*”, 2014 International Astronautical Congress, Toronto Canada, October 2014. – **winner of the 2014 Luigi G. Napolitano Award**

[C15] Lluçh i Cruz, I., Golkar, A., “*Resource Balancing Analysis of Federated Satellite Systems*”, AIAA Space Conference 2014, San Diego California.

[C14] Golkar, A., “*Federated Satellite Systems: Leverages and Threats Identification by Stakeholders Value Network Modeling*”, 31st AIAA International Communication Satellite Systems Conference, Florence (Italy), October 2013.

[C13] Golkar, A., “*Federated Satellite Systems: A Case Study on Sustainability Enhancement of Space Exploration System Architectures*”, International Astronautical Congress 2013, Beijing (China), September 2013.

[C12] Golkar, A., Filippazzo, G., “*Development of a Management Support Framework for Space Based Systems of Systems Programs*”, AIAA Space Symposium 2013, San Diego CA (USA), September 2013.

[C11] Golkar, A., “*Architecting Federated Satellite Systems for Successful Commercial Implementation*”, to appear at the AIAA Space Symposium 2013, San Diego CA (USA), September 2013.

[C10] Golkar, A., “*Federated Satellite Systems (FSS): A Vision Towards an Innovation in Space Systems Design*”, 9th IAA Symposium on Small Satellites for Earth Observation, Berlin (Germany), April 2013.

[C9] Aliakbargolkar, A., Crawley, E.F., “*Experimental Validation of a Systems Architecting Framework for Objectives Definition in a Concurrent Engineering Environment*”, ESA 5th International Workshop on System & Concurrent Engineering for Space Applications SECESA 2012, Lisbon (Portugal), October 2012.

[C8] Aliakbargolkar, A., Rudat, A., Crawley, E.F., “*A Delphi-Based Framework for Systems Architecting of In-Orbit Exploration Infrastructure for Human Exploration Beyond Low Earth Orbit*”, International Astronautical Congress IAC 2012, Naples, Italy, October 1-5, 2012.

[C7] Rudat, A., Battat, J., Aliakbargolkar, A., Dwyer, M., Cameron, B., Crawley, E.F., “*Tradespace Exploration Approach for Architectural Definition of In-Space Infrastructure Systems for Future Human Exploration*”, International Astronautical Congress IAC 2012, Naples, Italy, October 1-5, 2012.

[C6] Aliakbargolkar, A., Wicht, A., Battat, J., Calandrelli, E., Crawley, E.F., “*Heavy Lift Launch Vehicle Systems Architecting*”, International Astronautical Congress 2011, Cape Town, South Africa, October 3-7, 2011.

[C5] Aliakbargolkar, A., Crawley, E.F., “*Architecting Families of Space Systems: Application to Super Heavy Lift Transportation Infrastructure*”, ESA 4th International Workshop on System & Concurrent Engineering for Space Applications SECESA 2010, Lausanne (Switzerland), October 2010.

[C4] Cunio, P., Babuscia, A., Bailey, Z., Chaurasia, H., Goel, R., Aliakbargolkar, A., Selva, D., Timmons, E., Cohanim, B., Hoffman, J., Miller, D.W., “*Initial Development of an Earth-Based Prototype for a Lunar Hopper Autonomous Exploration System*”, AIAA Space 2009, Pasadena CA (USA), October 2009.

[C3] Aliakbargolkar, A., Keller, R., Robinson, B., de Weck, O.L., Crawley, E.F., “*A methodology for system architecting of offshore oil production systems*”, 11th International Design Structure Matrix Conference, Greenville (USA), October 2009.

[C2] Lettiero, M., Pecorario, A., Battagliere, M.L., Pifferi, E., Aliakbargolkar, A., Piergentili, F., Santoni, “*The Aurora Experiment: Overview and Preliminary Results*”, 19th ESA Symposium on European Rocket and Balloon Programmes and Related Research, Bad Reichenhall (Germany), June 7-11, 2009.

[C1] Gaudenzi, P., Aliakbargolkar, A., Capece, F. “*Design Tools for the Preliminary Sizing of a Satellite Bus and its Subsystems*”, ESA 3rd International Workshop on System & Concurrent Engineering for Space Applications SECESA 2008, Rome (Italy), October 2008.

THESES

[T3] Aliakbargolkar, A., “*A Framework for Systems Architecting under Stakeholder Objectives Ambiguity - Applications to Human Spaceflight and Robotic Exploration*”, PhD dissertation, Department of Aeronautics and Astronautics, Massachusetts Institute of Technology, June 2012.

[T2] Aliakbargolkar, A., “*Preliminary Design of Satellites Configurations and Structures*”, Laurea Specialistica thesis, Sapienza Universita' di Roma, May 2008.

[T1] Aliakbargolkar, A., “*Thermodynamics and Heat Transfer Analysis of a Pressurant Gas Tank for a Liquid Propulsion System*”, Laurea thesis, Sapienza Universita' di Roma, September 2006.

POPULAR ARTICLES

[P1] Golkar, A., “*Developing space infrastructure: the future of aerospace technology is now*”, Russian Beyond the Headlines (English and Italian Edition), November 18, 2014.