




Beyond the Horizon: From TUM to NASA's Jet Propulsion Laboratory

Maximilian Vierlboeck, Ph.D. — November 27, 2024


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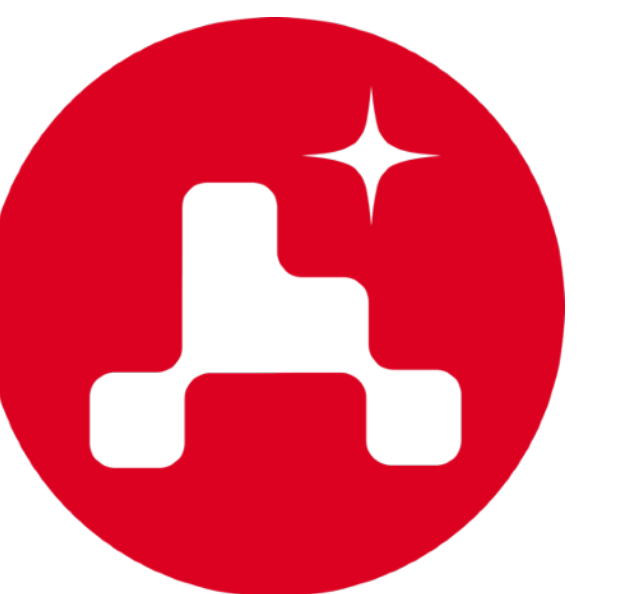
Welcome to My Journey



2011-2018 



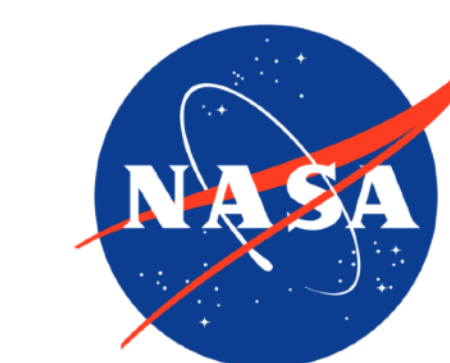
2019-2023 



TMT
THIRTY METER TELESCOPE



2023



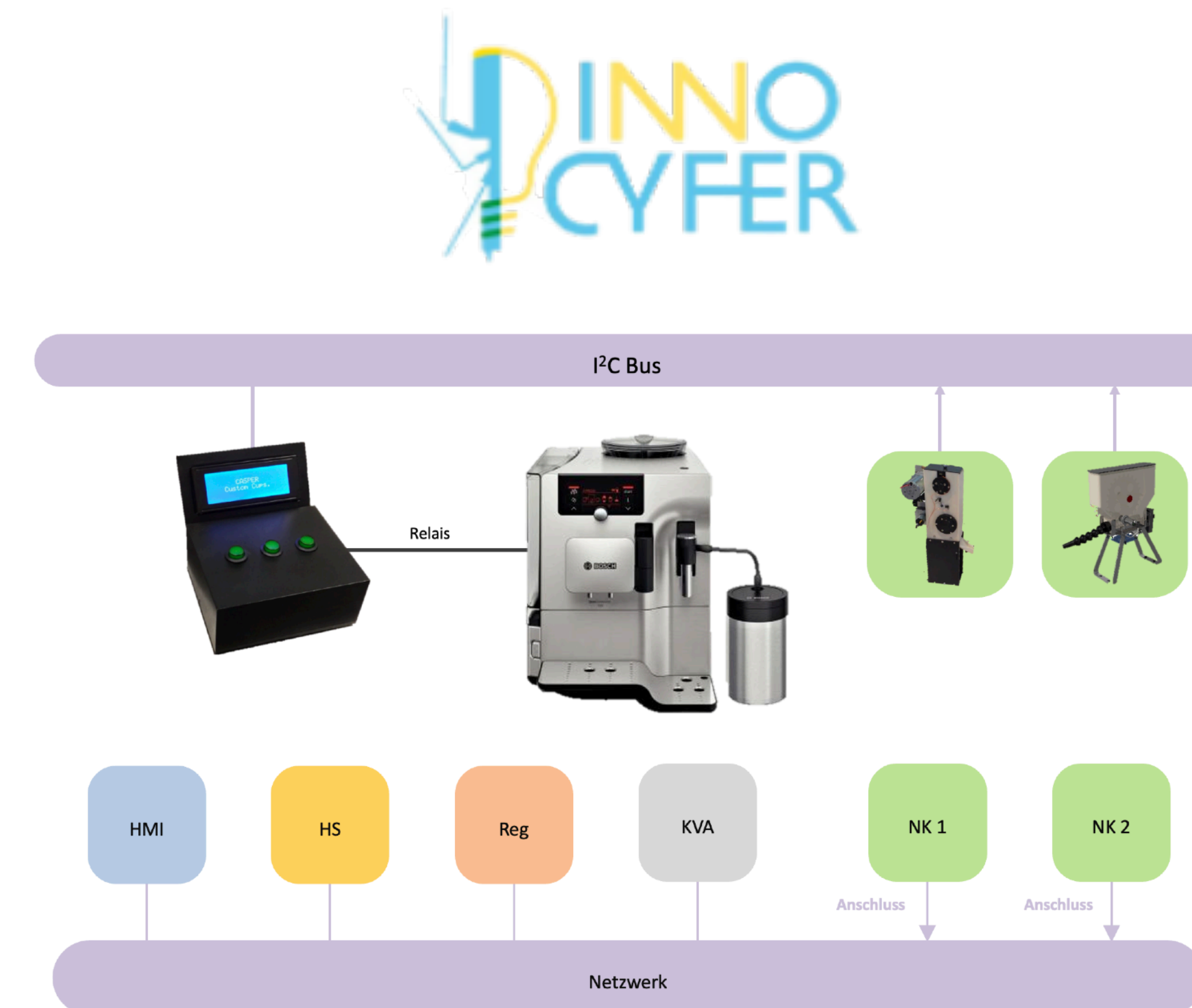
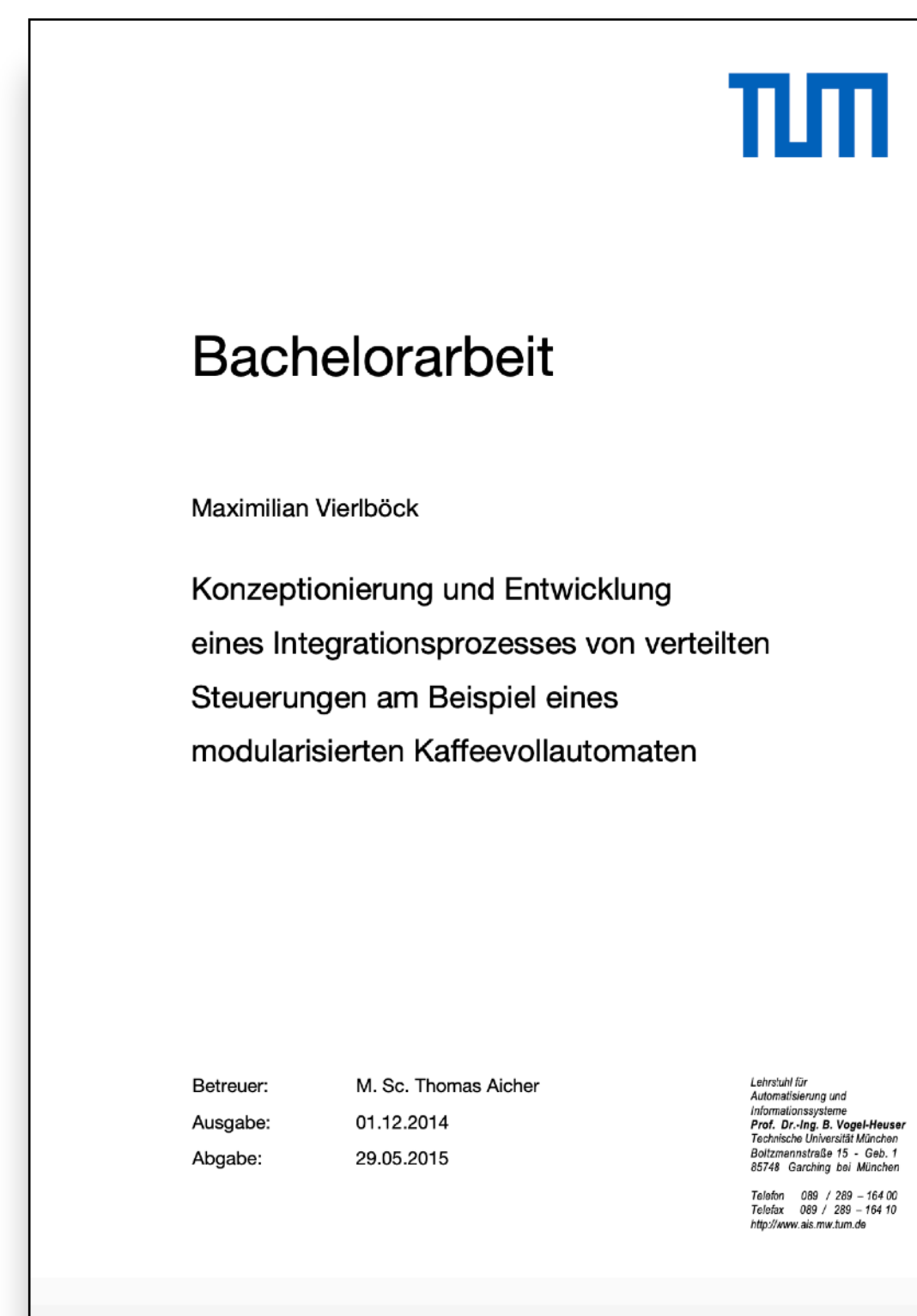
Jet Propulsion Laboratory
California Institute of Technology

My TUM Experience

Bachelor's Degree



Institute of Automation and Information Systems

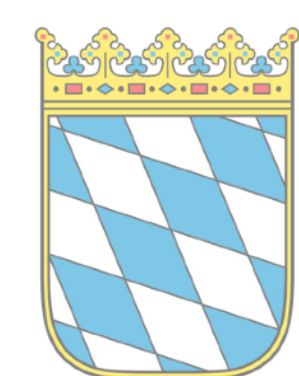


Chair of Product Development



13-17 April 2015

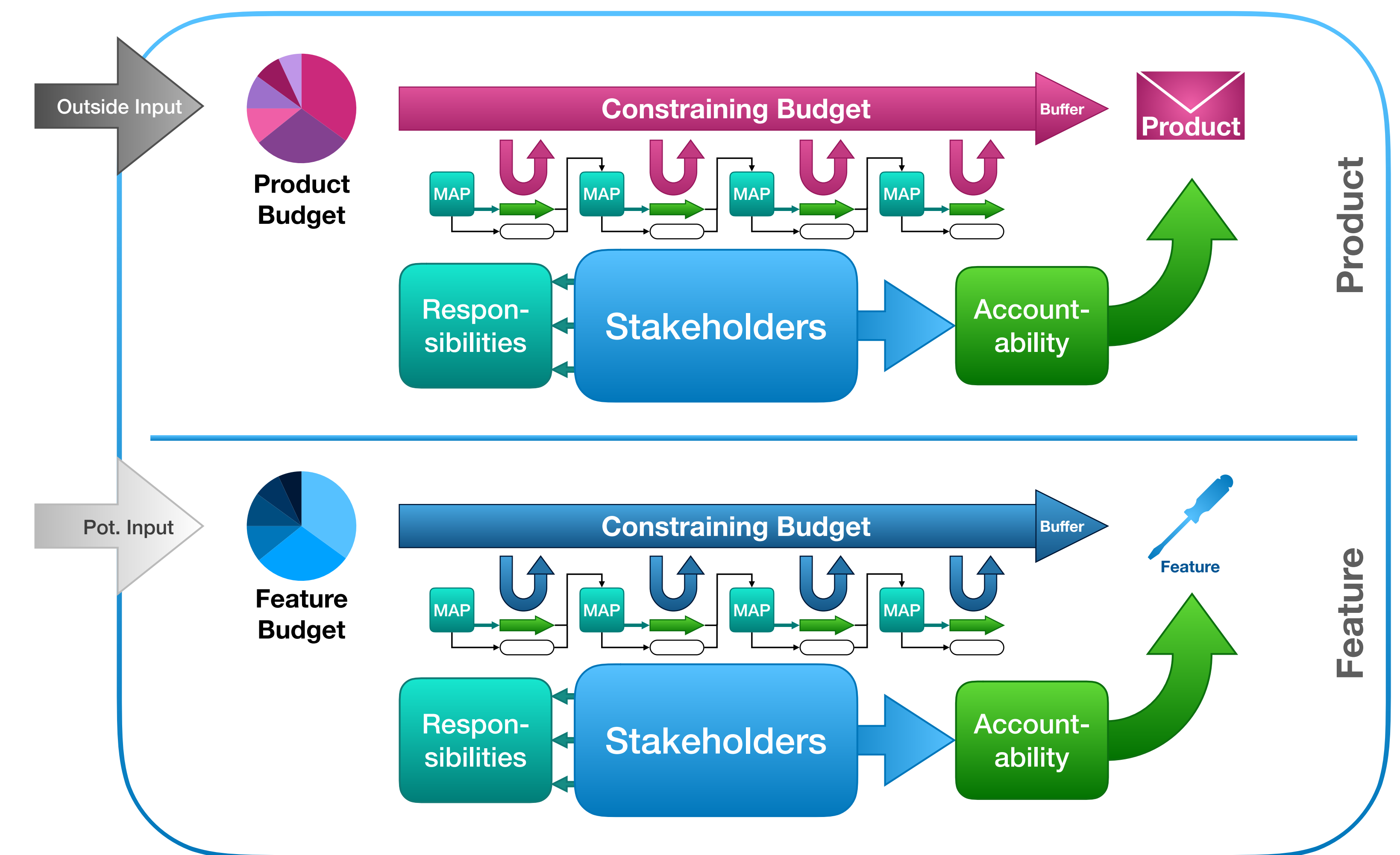
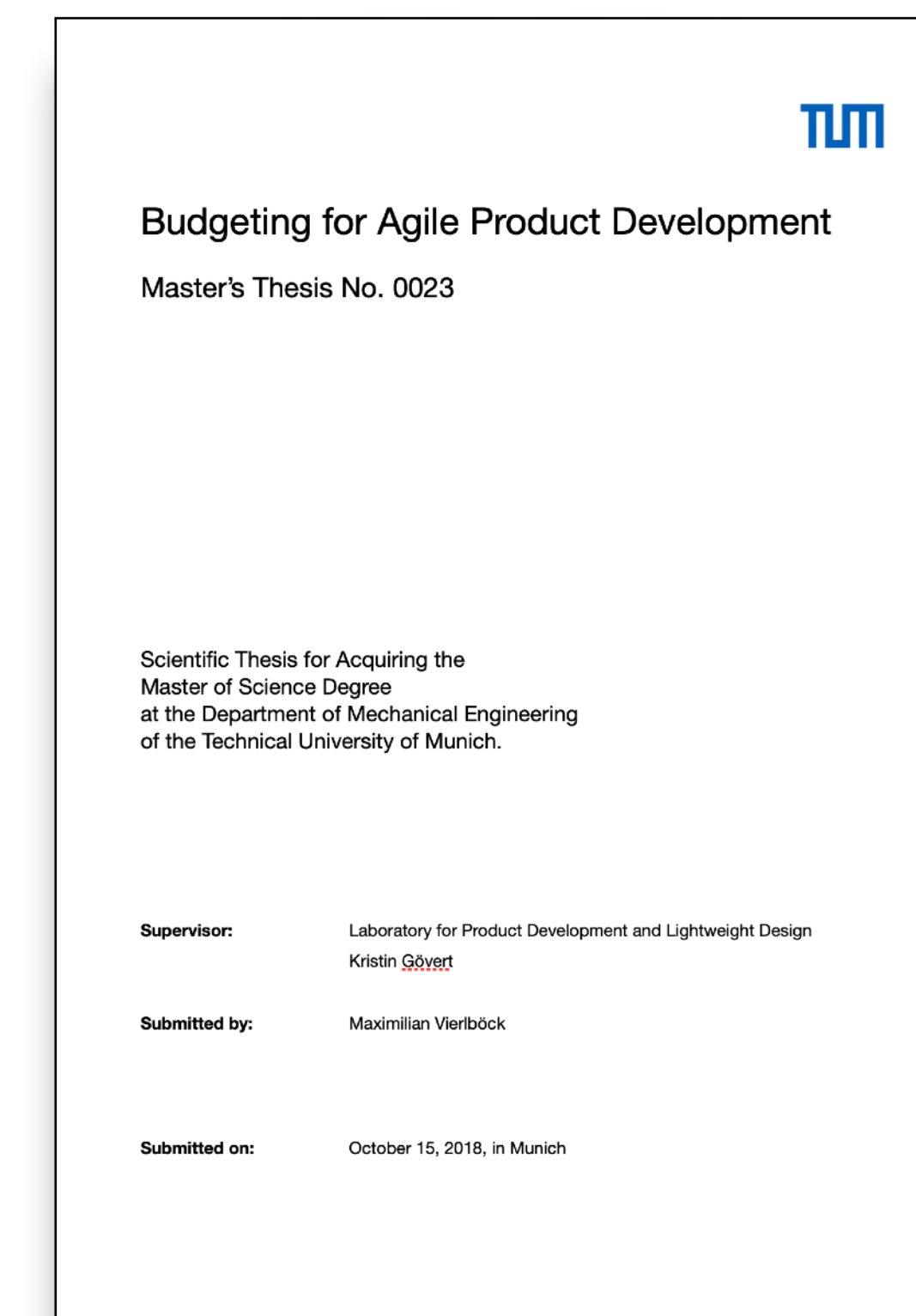
2011-2018



Master's Degree



LPL – Laboratory for Product Development and Lightweight Design



Vierlboeck M, Gövert K, Trauer J, Lindemann U.
Budgeting for Agile Product Development. **ICED 2019**.
DOI:10.1017/dsi.2019.223

Facing Uncertainties



Start again from the beginning?



"Piled Higher and Deeper" by Jorge Cham www.phdcomics.com


Leave everything behind?

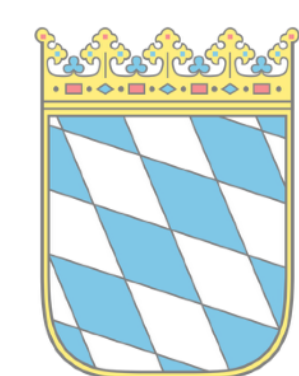


Get off the default path?

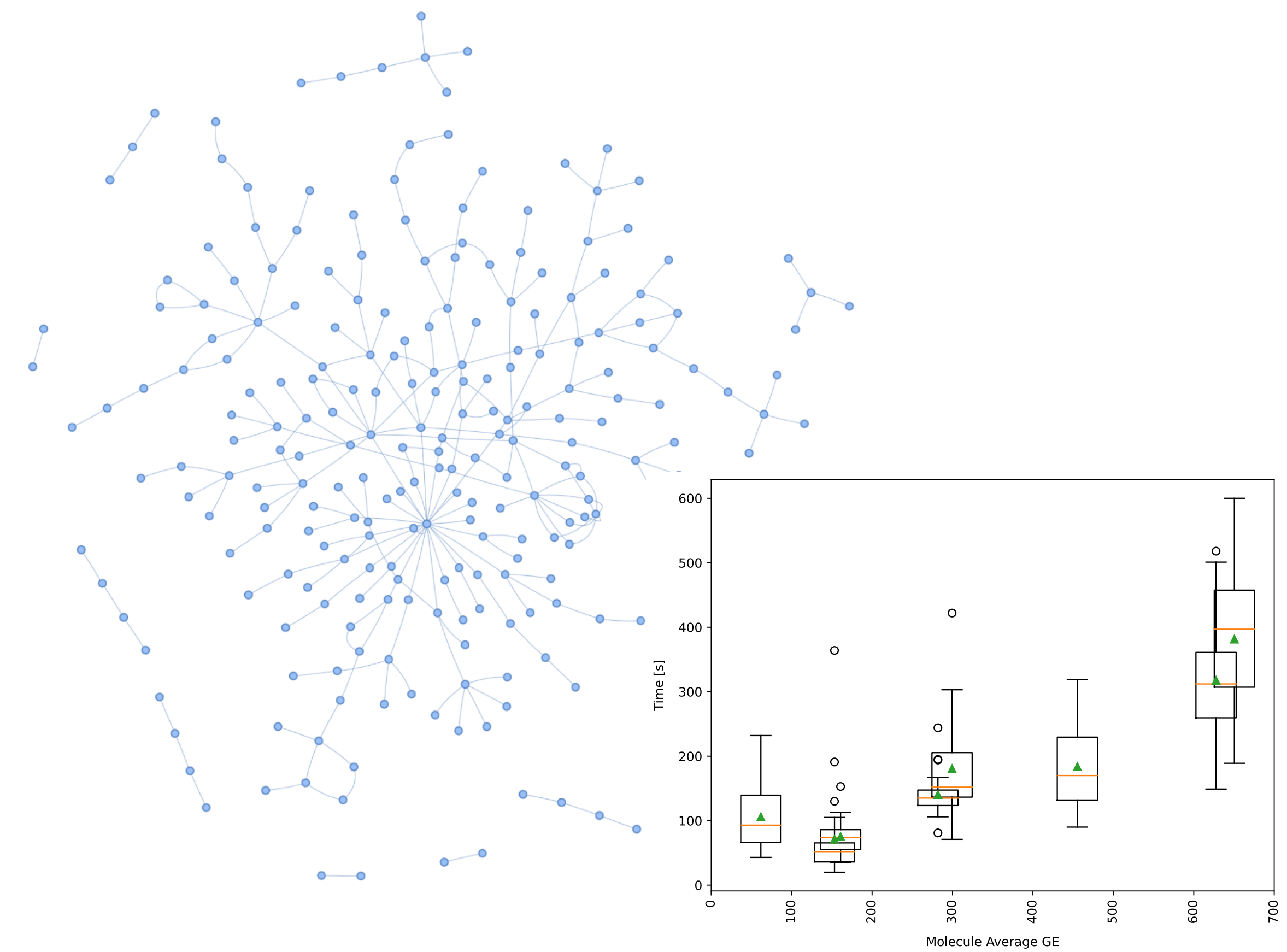
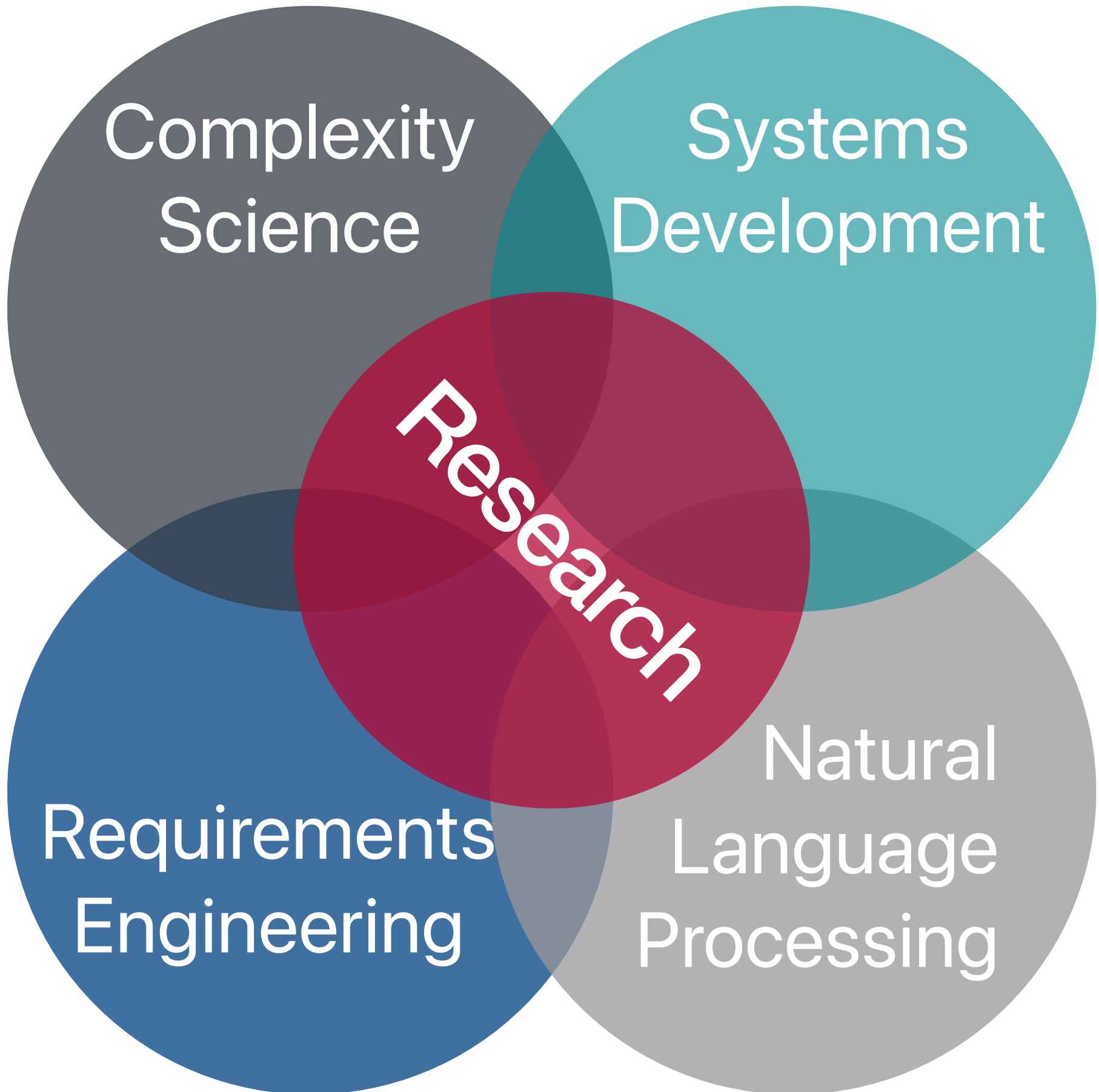
Salary ✓ Apply at BMW?
Stability ✓ Knorr-Bremse?
Industry?



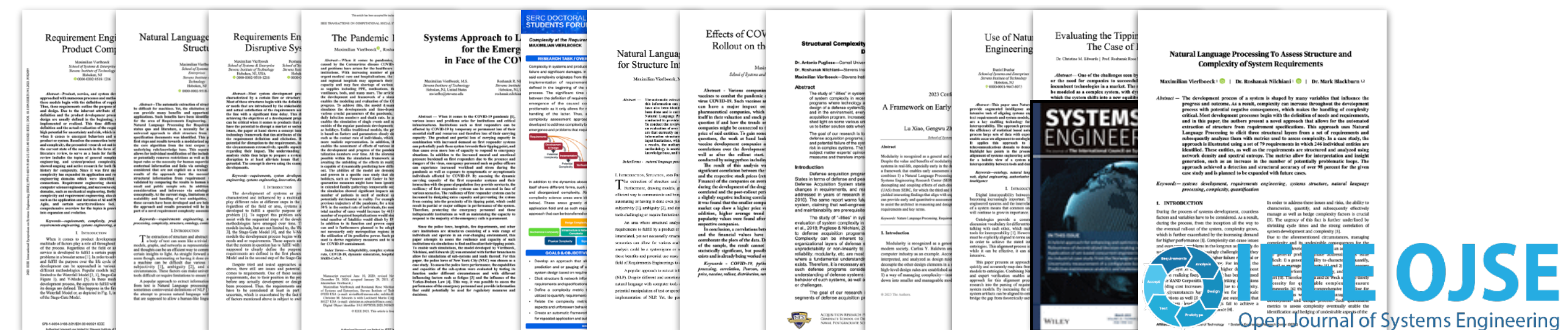
2011-2018 



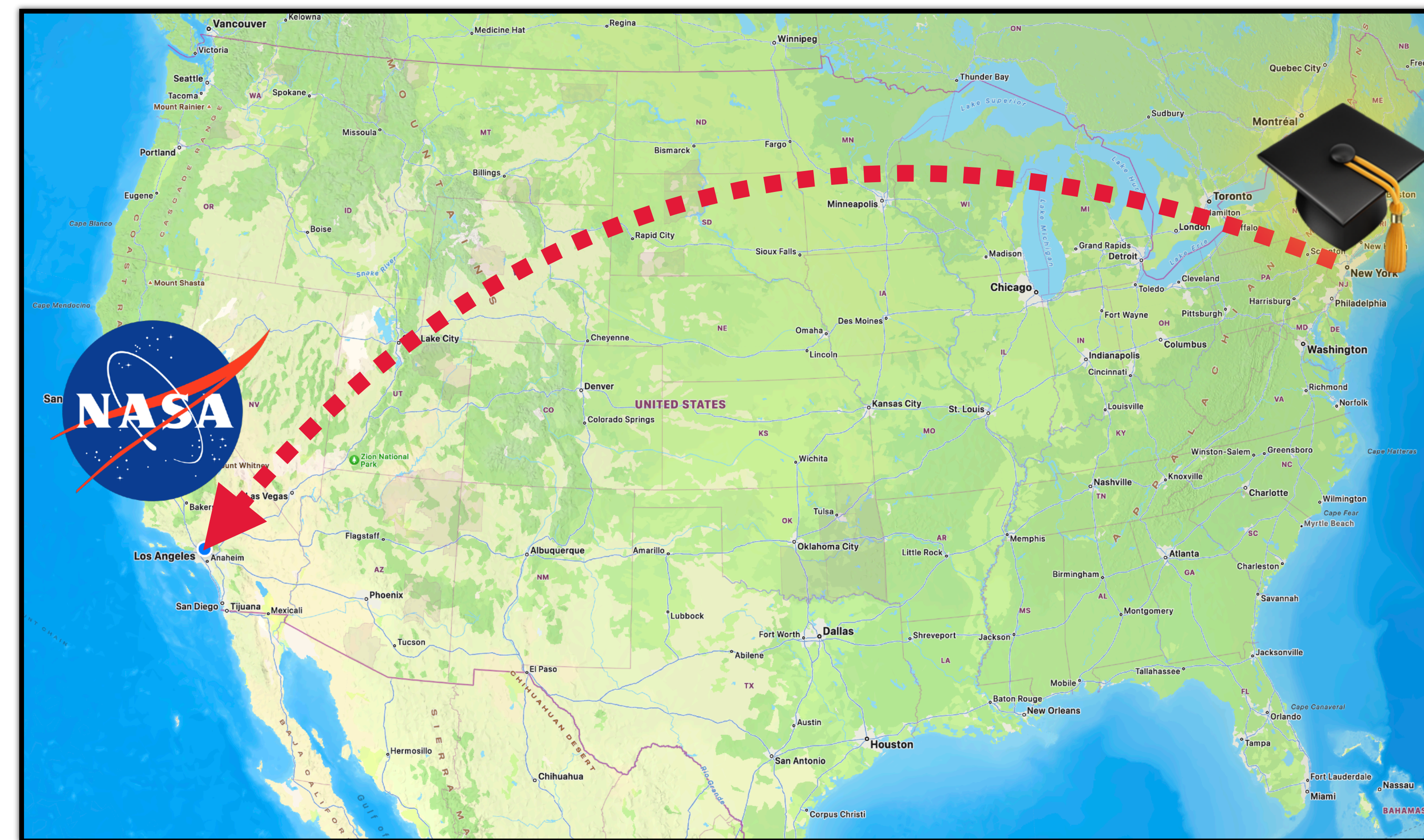
Navigating Change



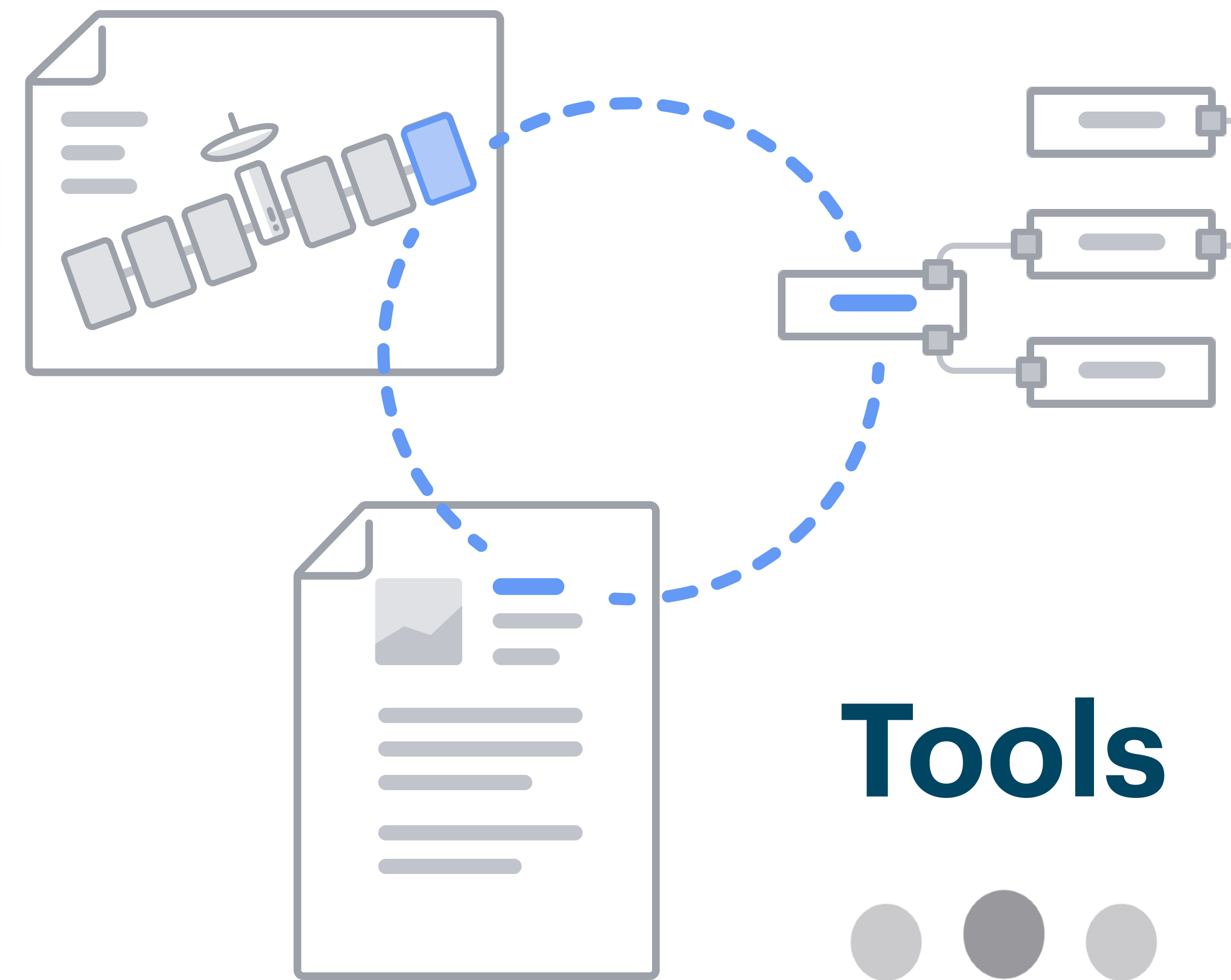
2019-2023



...and Challenges



Models



Tools

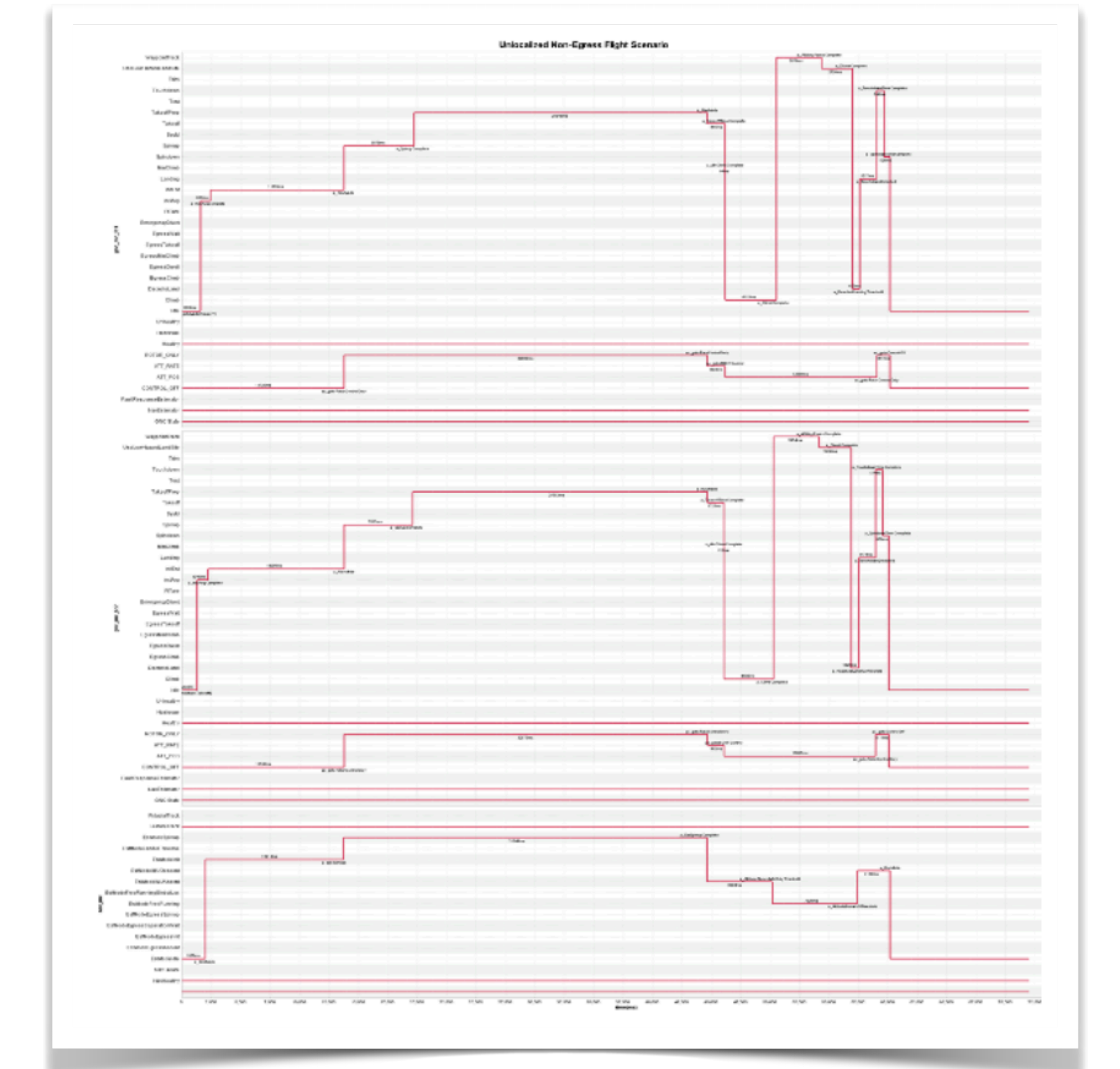


Technologies

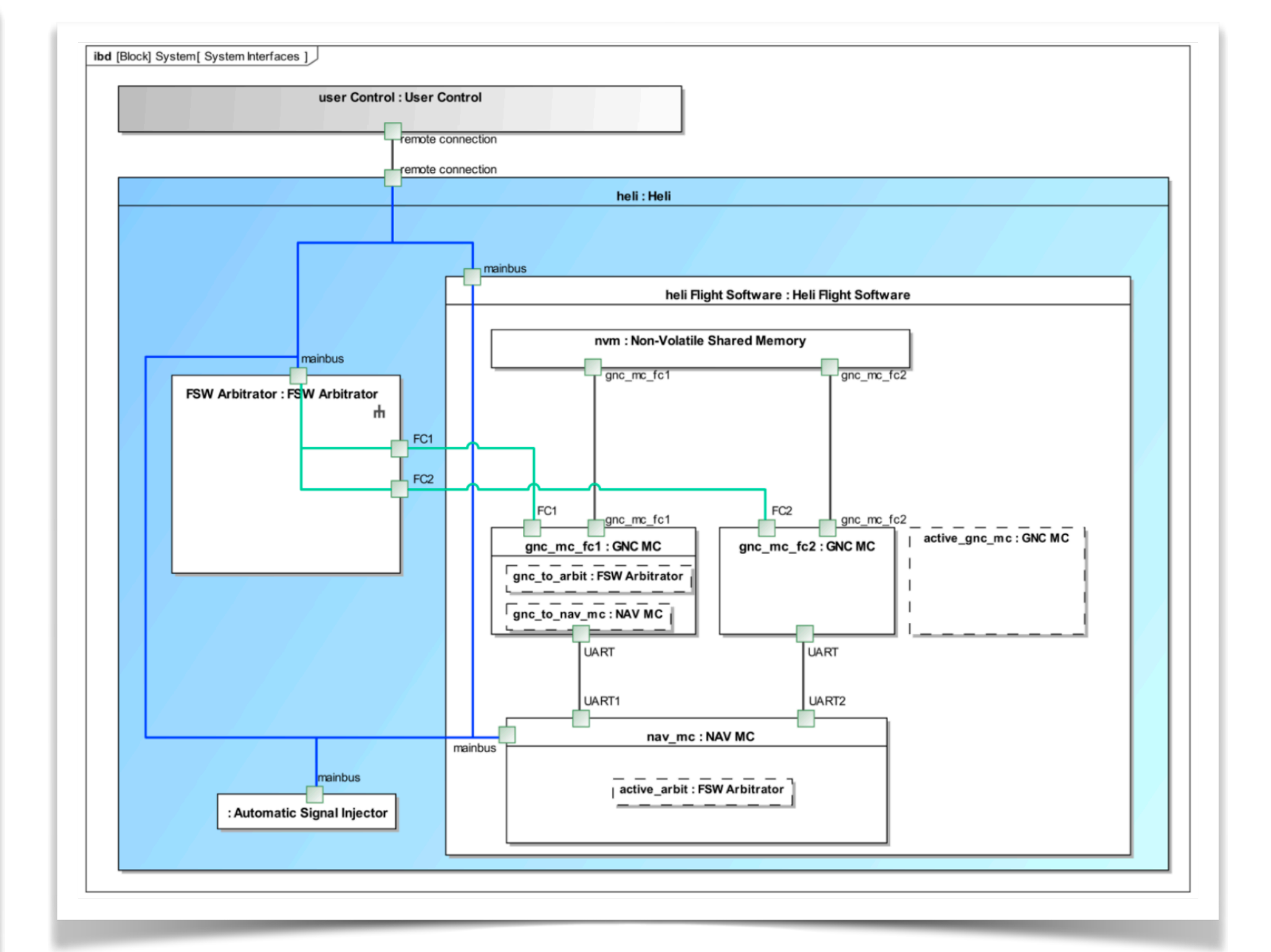
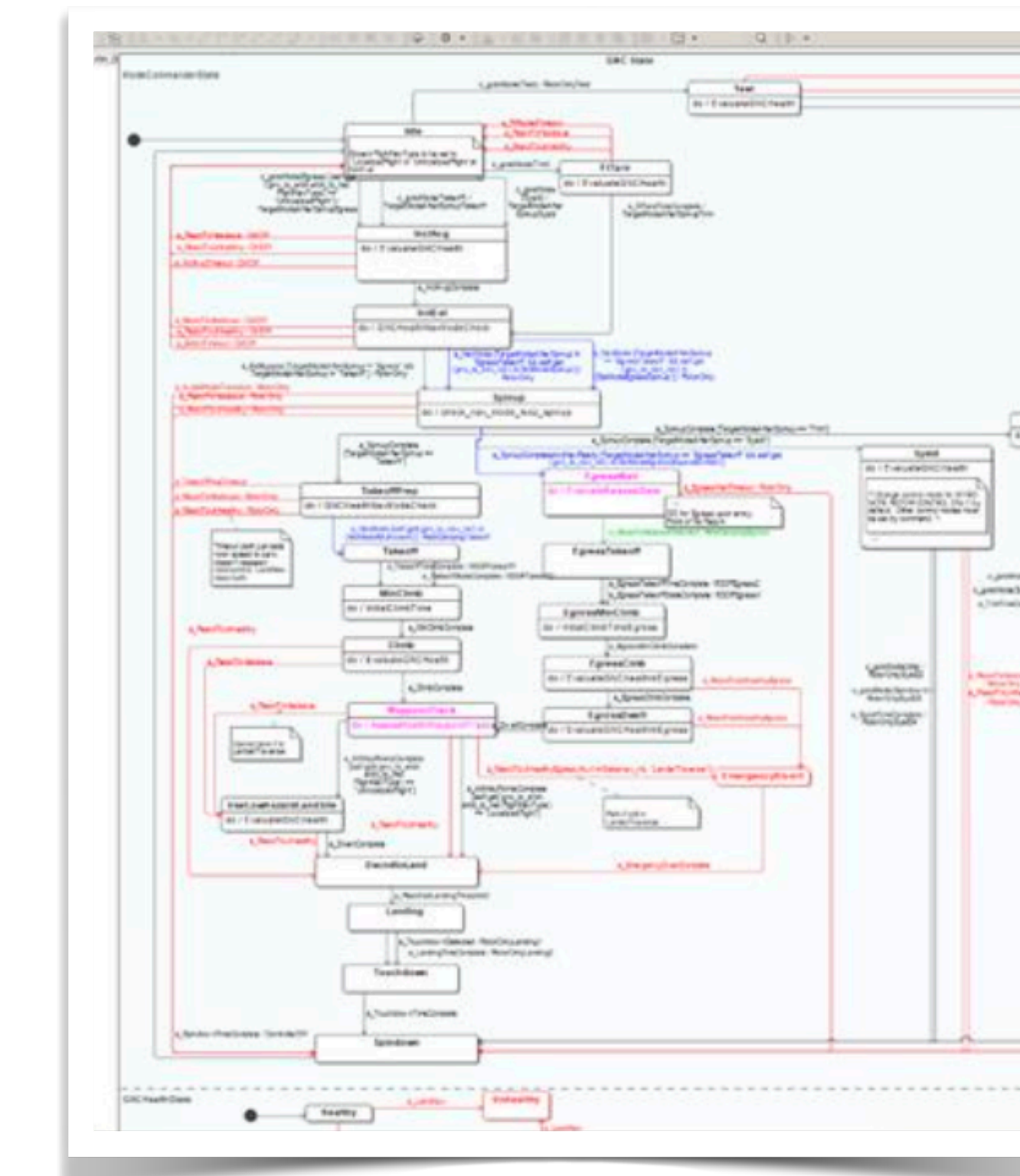
Ingenuity



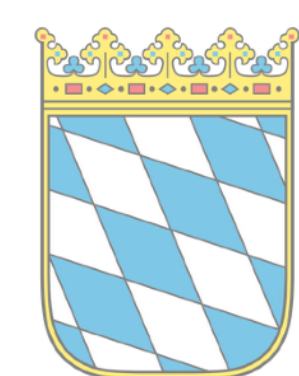
High Stakes



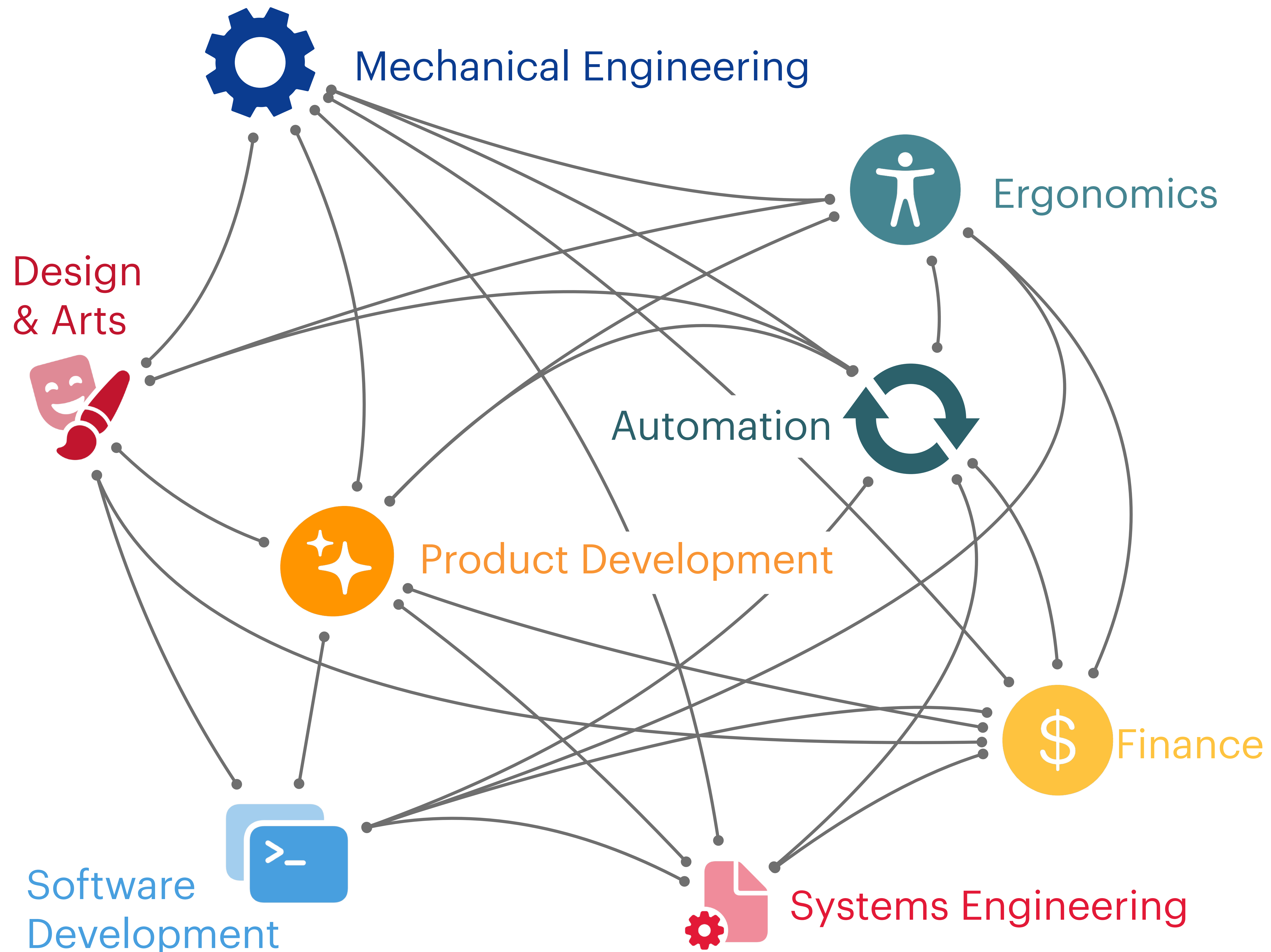
Complex Systems



2023



The Role of Insatiable Curiosity

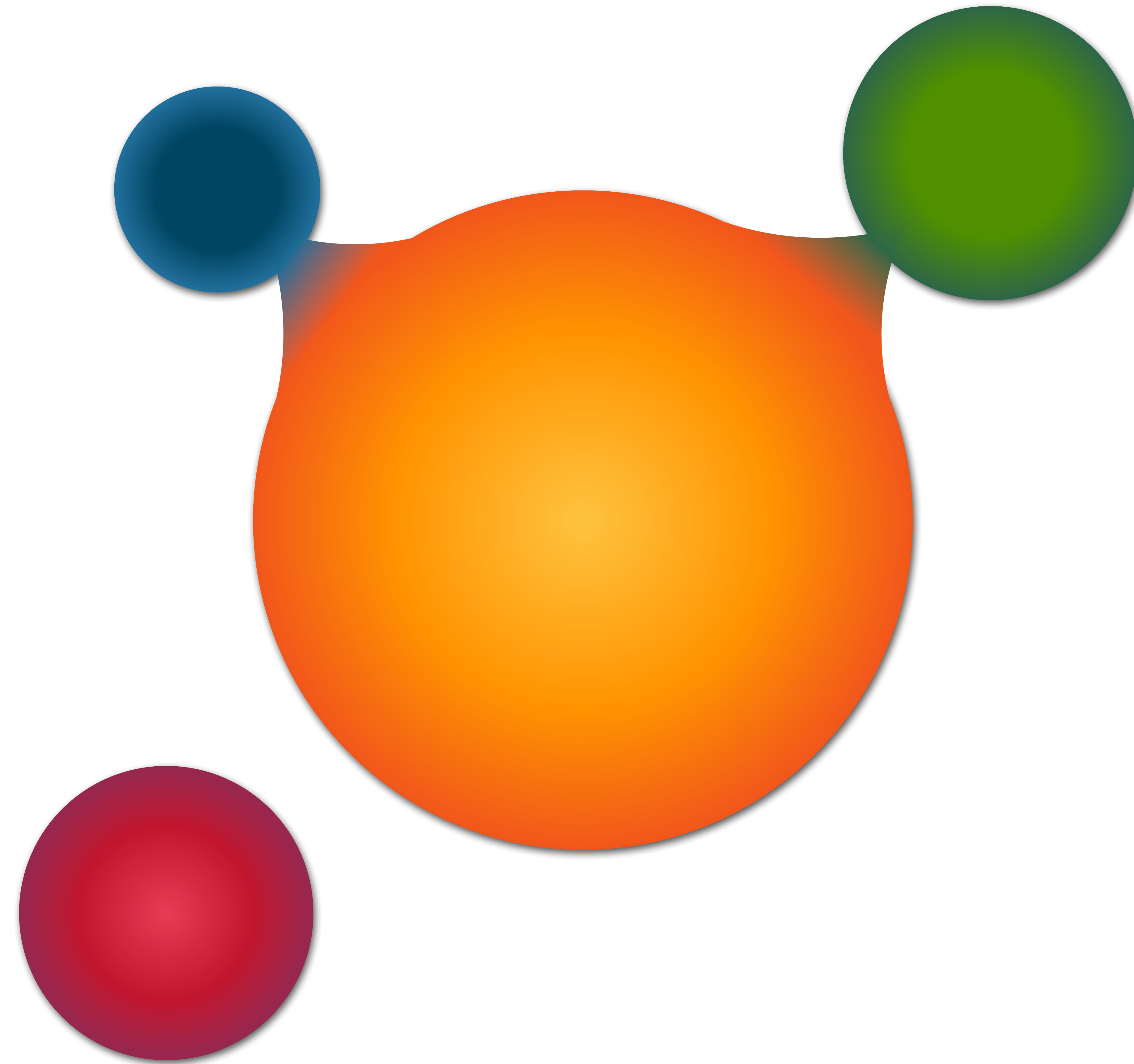


You can learn anything.

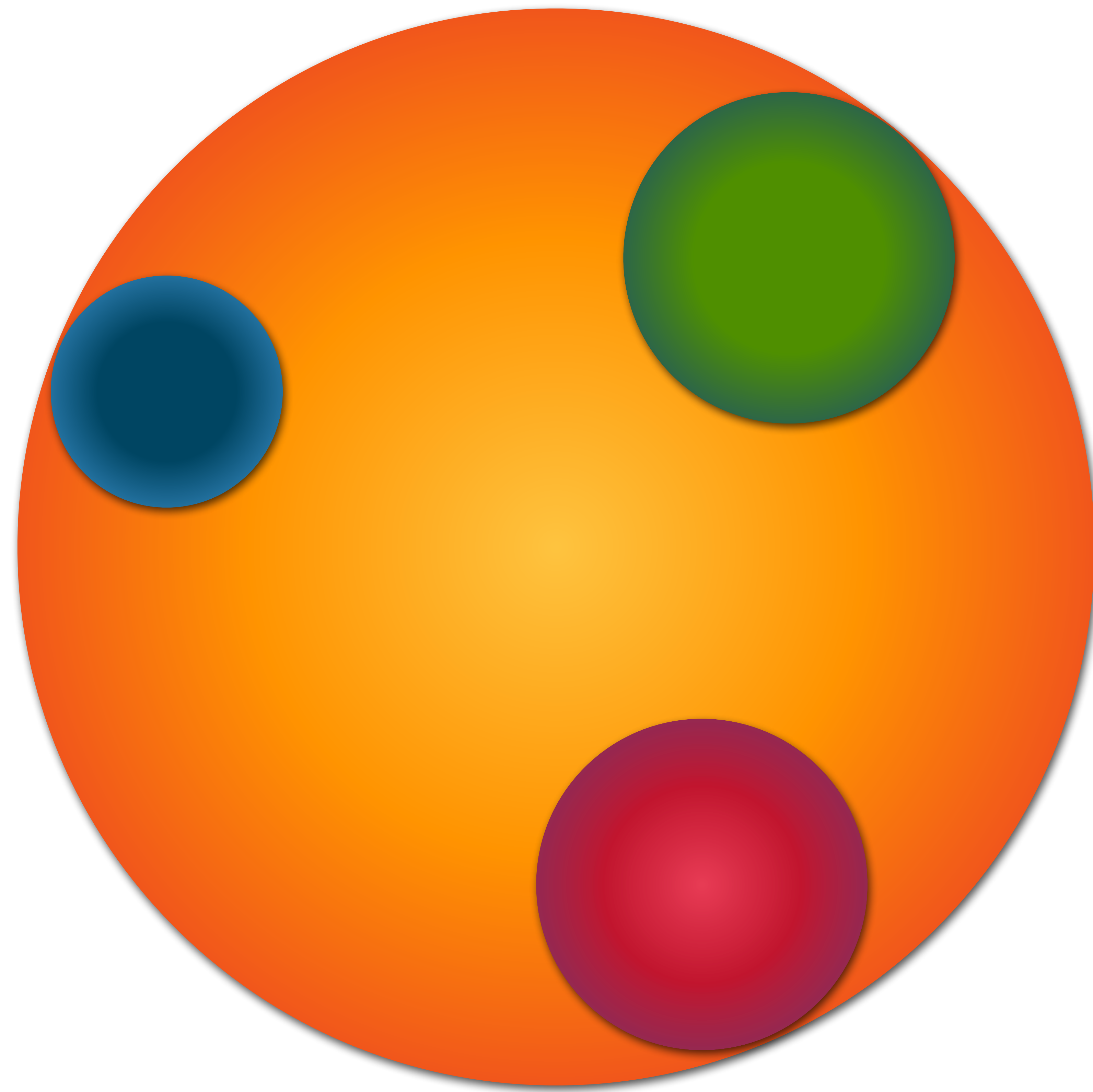
Be Curious About Everything!

Teach Yourself.

The Role of Insatiable Curiosity



The Role of Insatiable Curiosity



TUM – Foundation of Excellence

Exams

Research

Life?

Projects

Courses

Classes



Self & Time Mgmt

Critical Thinking

Adaptability

Creativity

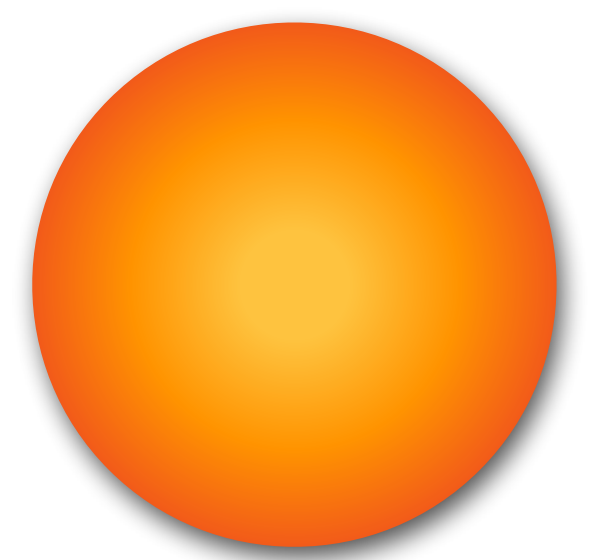
Intuition

At TUM, you don't merely memorize facts; you learn how to learn and continuously solve complex problems that you have never encountered before.

Embracing the Future and Your Potential

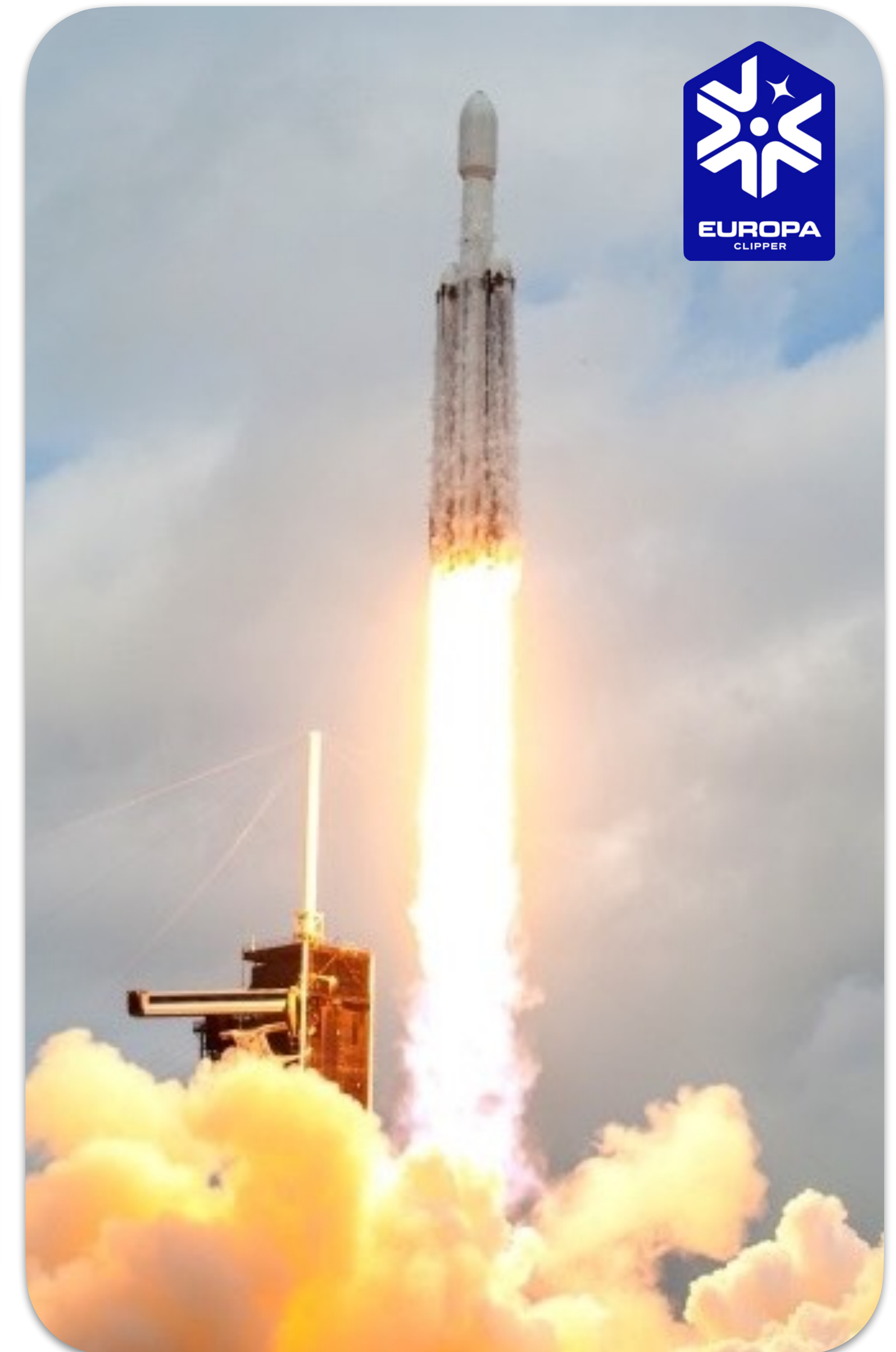
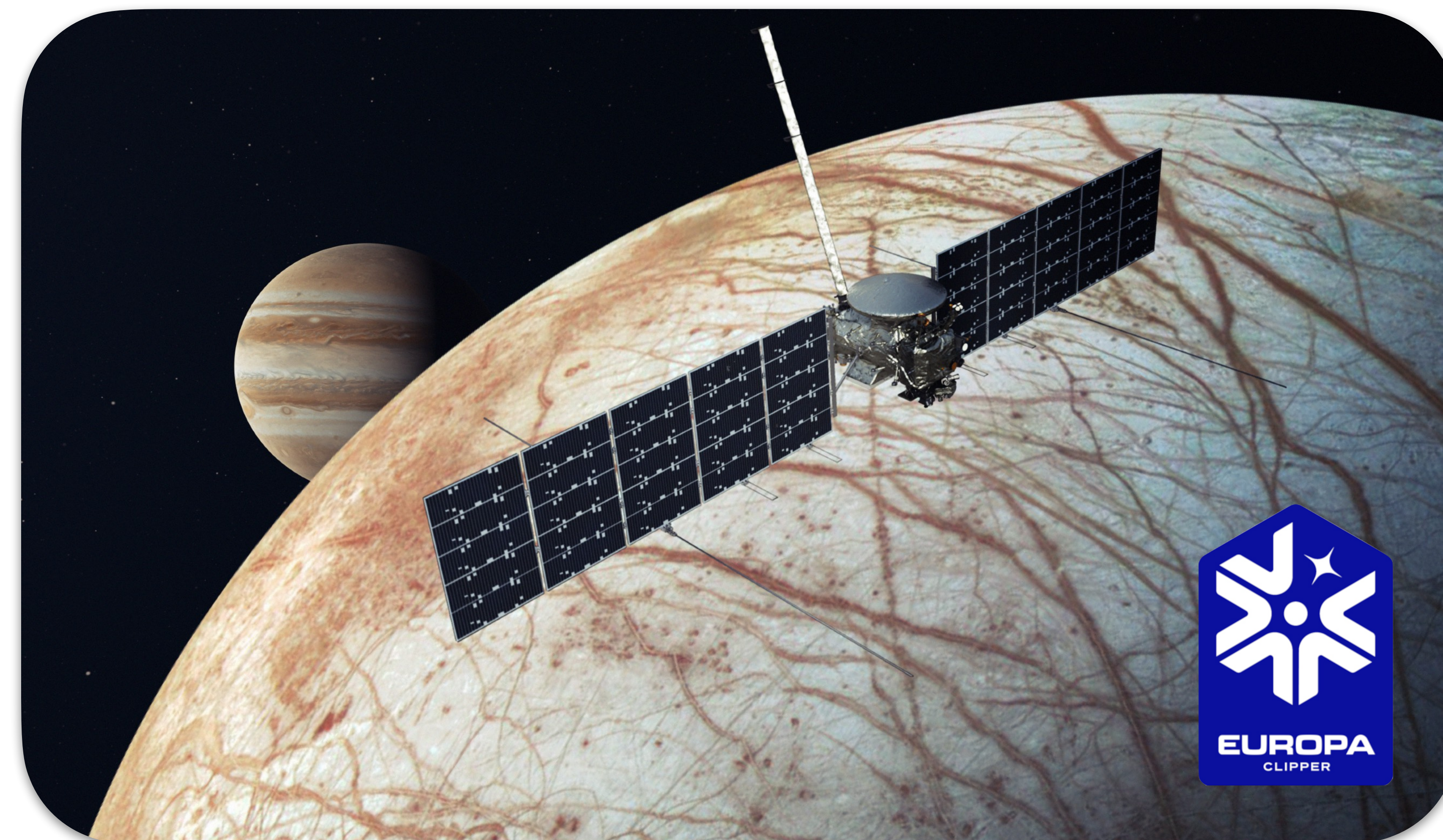
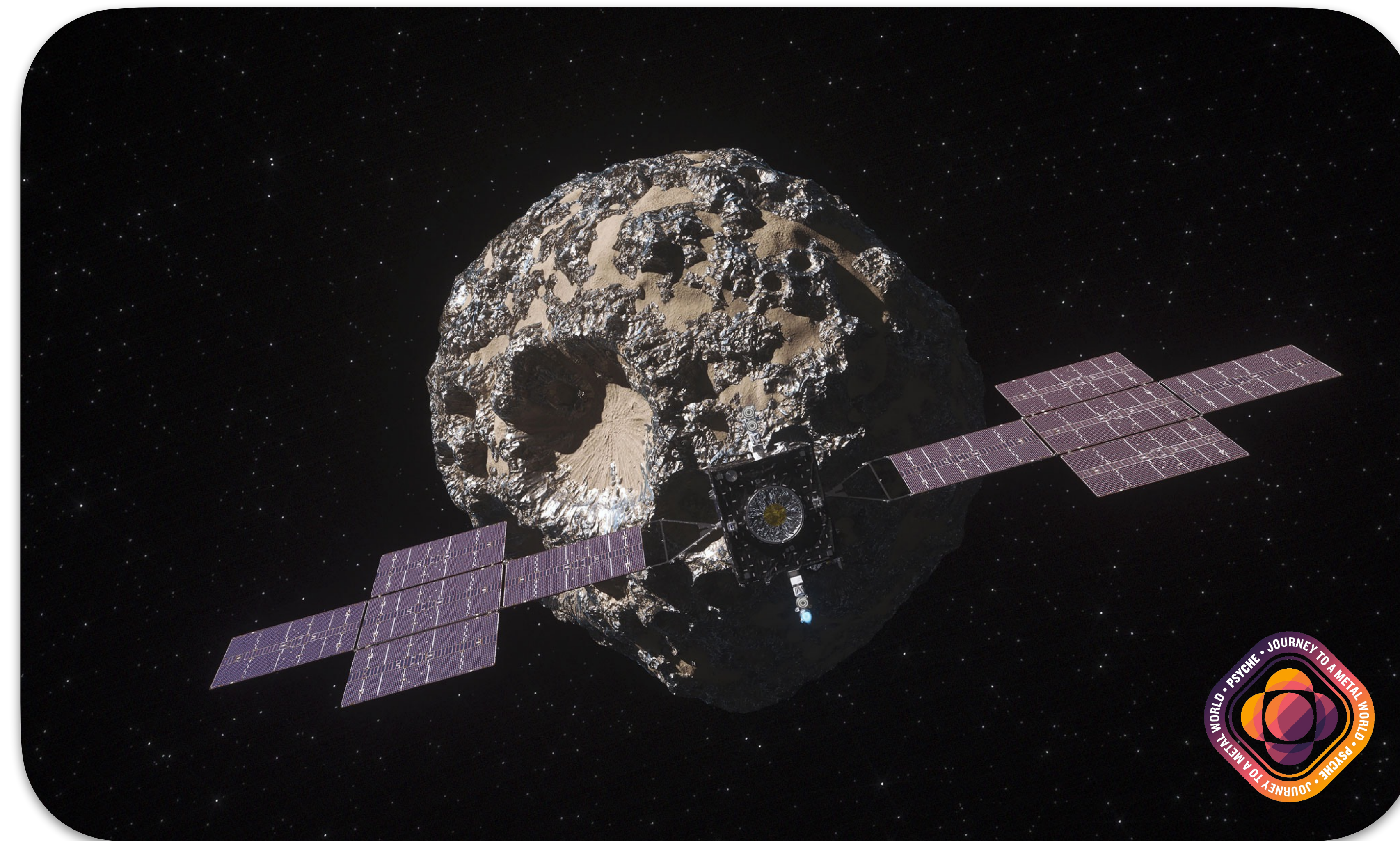
You Have the Foundation—Build on It!

Beyond the Horizon, Outside of Your Comfort Bubble!

A wide-angle photograph of Earth from space, showing the curvature of the planet and the blue atmosphere. A bright sun is on the left, creating a lens flare, and a crescent moon is visible in the upper right. The text 'Trust your Intuition!' is overlaid in white.

Trust your Intuition!

Dare Mighty Things



Myth-Busting – Unmasking Fears

I am not a native speaker, how can I be successful in the U.S.?

▶ The majority of Ph.D. candidates come from abroad; during my time at Stevens, it was over 80%.

Studying in the U.S. is expensive, everyone has student loans (\$100K+)

▶ The majority of Ph.D. Candidates are fully funded and do not pay tuition. Research and Teaching Assistantships provide funding and income.

Only Ivy League graduates get top jobs in the U.S.

▶ Nope.

What if I choose wrong or fail? I can't afford to make mistakes.

▶ The results of failure are just another complex problem to solve.



Q&A

Contact Information

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Picture Sources

Beyond the Horizon

- Photo of NASA's Jet Propulsion Laboratory. Credits: NASA/JPL-Caltech: https://www.nasa.gov/wp-content/uploads/2018/06/jpl_vista-16.jpg

Welcome to My Journey

- Personal Photos
- Bavarian Coat of Arms: https://en.wikipedia.org/wiki/Coat_of_arms_of_Bavaria#/media/File:Bayern_Wappen.svg
- TUM Logo: https://commons.wikimedia.org/wiki/File:Logo_of_the_Technical_University_of_Munich.svg
- Stevens Logo: <https://www.stevens.edu/>
- OpenMBEE Logo: <https://www.openmbee.org/>
- TMT Logo: https://www.linkedin.com/company/tmt-observatory-corporation/?trk=similar-pages_result-card_full-click&originalSubdomain=in
- Various JPL and Mission Logos
- DSN Logo: https://en.wikipedia.org/wiki/NASA_Deep_Space_Network#/media/File:50th_Anniversary_NASA_Deep_Space_Network.png
- NASA Jet Propulsion Laboratory (JPL) Logo: [https://commons.wikimedia.org/wiki/File:NASA_Jet_Propulsion_Laboratory_\(JPL\)_Logo.webp](https://commons.wikimedia.org/wiki/File:NASA_Jet_Propulsion_Laboratory_(JPL)_Logo.webp)

My TUM Experience

- Institute of Automation and Information Systems and Logo: <https://www.mec.ed.tum.de/en/ais/homepage/>
- Chair of Product Development and Logo: U. Lindemann, "Methoden der Produktentwicklung - Einführung/Produktentwicklung", 2013
- Excerpts from Bachelor's Thesis: M. Vierlböck, "Konzeptionierung und Entwicklung eines Integrationsprozesses von verteilten Steuerungen am Beispiel eines modularisierten Kaffeevollautomaten", 2015
- Logo Hannover Messe: https://www.flickr.com/photos/ericsson_images/46661664724
- TUM LPL and Logo: <https://www.mec.ed.tum.de/en/lpl/home/>
- Excerpts from Master's Thesis: M. Vierlböck, "Budgeting for Agile Product Development", 2018

Picture Sources

Facing Uncertainties

- Handshake Image: https://www.flickr.com/photos/foto_db/54003425558/
- Research Cycle Comic: <https://phdcomics.com/comics/archive.php?comid=1759>
- Dramatic Crossroads: AI Generated Image

Navigating Change

- Personal Photos
- Excerpts from Dissertation: M. Vierlboeck, “Structural Complexity of System Requirements and Its Implications for the Development Process,” 2023, ISBN: [979-8-37-956769-9](https://doi.org/10.1007/978-8-37-956769-9), [PDF](#).
- Front Pages of Publications: see maximilian.vierlboeck.com/publications
- Wiley Systems Engineering Journal Cover: <https://onlinelibrary.wiley.com/action/showCoverImage?journalCode=15206858>
- IEEE OJSE Logo: https://ieeaeess.org/files/ieeaeess/styles/large/public/images/media/photos/ojse22_logo-02.png?itok=SQeS68US

...and Challenges

- NASA Logo: https://en.m.wikipedia.org/wiki/File:NASA_logo.svg
- OpenMBEE Image: <https://www.openmbee.org/>
- Ingenuity Helicopter: [https://commons.wikimedia.org/wiki/File:Mars_Helicopter_Ingenuity_\(transparent_background\).png](https://commons.wikimedia.org/wiki/File:Mars_Helicopter_Ingenuity_(transparent_background).png)
- SysML Diagrams: L. Jones-Wilson, F. Karagoz, M. Vierlboeck, T. Boyer-Chammard, V. Gehlot, & H. Grip, “Mars Sample Recovery Helicopter Aerial Mode Commander Design Using Executable Models,” submitted to 2025 IEEE Aerospace Conference, 2025.

TUM – Foundation of Excellence

- Personal Photo
- AI Generated Image

Picture Sources

Embracing the Future and Your Potential

- Sunrise In Space: <https://www.pickpik.com/sunrise-space-outer-globe-world-earth-3778>

Dare Mighty Things

- Psyche Launch Photo: <https://science.nasa.gov/wp-content/uploads/2023/08/psyche-launches.jpeg?w=4096&format=jpeg&crop=1>
- Psyche Spacecraft Concept Art: <https://www.jpl.nasa.gov/news/6-things-to-know-about-nasas-asteroid-exploring-psyche-mission/>
- Europa Clipper Spacecraft Concept Art: <https://science.nasa.gov/image-detail/europa-clipper-16x9/>
- Europa Clipper Launch Photo: <https://plus.nasa.gov/video/nasas-europa-clipper-launch/>
- NASA logo: https://commons.wikimedia.org/wiki/File:NASA_logo.svg

Q&A

- Carina Nebula: <https://www.flickr.com/photos/nasawebbtelescope/52259221868/in/album-72177720300469752>

Contact Information

- NASA-JPL.jpg: <https://commons.wikimedia.org/wiki/File:NASA-JPL.jpg>