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From Here to Embraer (Year II): *An Engineering-Based Brazilian Study Abroad Collaboration*

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UCF Honors Study Abroad

Fast Facts:

- 8-10 UG Students
- 1 Faculty Mentor
- 1 Staff Member
- 9 or 10 days

Historically, most study abroad programs have focused on art, history, or social issues | What about Engineering!

From Here to Embraer (Year I)

About the Program Leaders: Dr. Gordon

Mechanics of Materials Research Group (MOMRG)

- Associate Professor in Mechanical & Aerospace Engineering
- Interim Associate Dean of Graduate Studies, CECS

Teaching Activities:

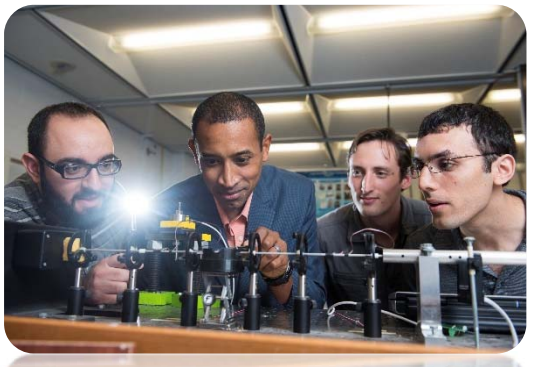
- Courses Taught: Mechanical Systems Laboratory (u), **Machine Design (u),** Solid Mechanics (u), Fracture (g), **Fatigue (g)**, Intermediate Mechanics of Materials (g), and more

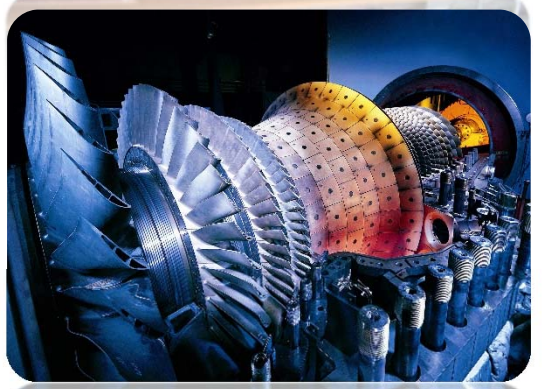
Professional Activities of the PI/Group:

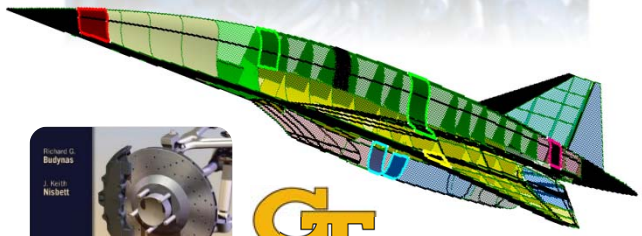
- ASME Members & Advisor to NSBE Student Section
- Active in both ASME Pressure Vessel & Piping (PVP) Division and International Gas Turbine Institute (IGTI)

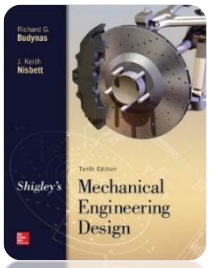
Academics Highlights:

- Six PhD students completed; six PhD students about to finish
- Two-time recipient of UCF Teaching Incentive Program (TIP) Award
- Air Force Summer Faculty Fellow (2013, 2014, 2015, & 2018)
- Recipient of ASME Awards for Best Paper:
  - Materials Division: Orr Award
  - Pressure Vessel and Piping Division: Widera Award









MOREHOUSE

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About the Program Leaders: Mr. Rodrigo Lenartowicz

- Birthplace: Sao Paulo, Brazil
- Embraer Connection:
  - Grandfather and Aunt worked at Embraer.
  - Grandfather was the 1st pilot to cross the Atlantic on an Embraer Bandeirante on his way to Saudi Arabia.
- Academic Preparation:
  - Univ. of Texas at Austin
  - Latin American History

- Languages:
  - Fluent: **Portuguese**, English, Spanish, and French
  - Some knowledge: Polish and Chinese
- Position: Coordinator, Administrative Services, Mechanical & Aerospace Engineering

- **Population:** 11th largest city in the world (21M in metro area)
- **Immigration:** Germans, Portuguese, French, Spanish, Italian, Japanese
- **Activity:** Commerce, financial, and entertainment center
- **Centers of Technology:** Campinas, Sao Jose dos Campos, etc.

PARQUE TECNOLÓGICO São José dos Campos

UNICAMP

INPE

ITA

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Program Learning Outcomes

1. To what extent can we gain a global perspective of aerospace manufacturing through study abroad?
2. How is the aerospace manufacturing process carried out by an international engineering company?
3. What are the contemporary challenges of aerospace manufacturing companies?
4. How does airplane manufacture differ across companies?

Program Attributes:

- Full Semester Course
- EAS 3955H 3 Credits
- Spring Break Travel
- No Pre-Requisites
- Engineering Credit

Piper®

Searey
EXPLORE NO LIMITS

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Course Approach

Preparatory Activities:

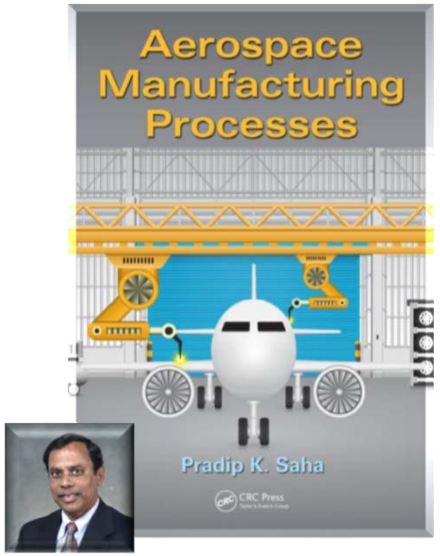
- Work as a class to learn Aerospace Manufacturing Processes
- Visit Florida-based aircraft manufacturing facilities (Sanford Airport, Embraer, etc.)
- Attend various invited seminars

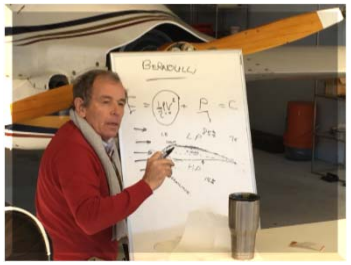
Primary Activities:

- Travel to Embraer (Brazil) to tour engineering facilities
- Interact with students in the PEE program
- Work individually to analyze several contemporary topics in aerospace manufacturing or design

Follow-Up Activities:

- Share experiences with others





EMBRAER

- OEM of commercial, military, executive, and agricultural jets
- Deliveries: 225 (2016)
- $6B in business per year
- Locations: Sao Jose dos Campos, Portugal, and **Melbourne, FL**
- www.embraer.com

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Phenom 100:

4-7 passengers; 1.7kip thrust; 41kft altitude; Mach 0.78; 1,178nmi range

Phenom 300E:

6-10 passengers; 3.4kip thrust; 45kft altitude; Mach 0.78; 1,971nmi range

Legacy 450:

7-9 passengers; 7.5kip thrust; 45kft altitude; Mach 0.83; 2,904nmi range

Legacy 500:

8-12 passengers; 7kip thrust; 45kft altitude; Mach 0.83; 3,125nmi range

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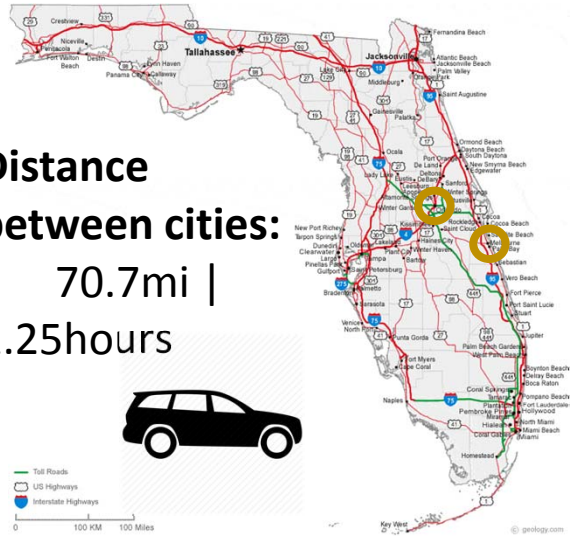
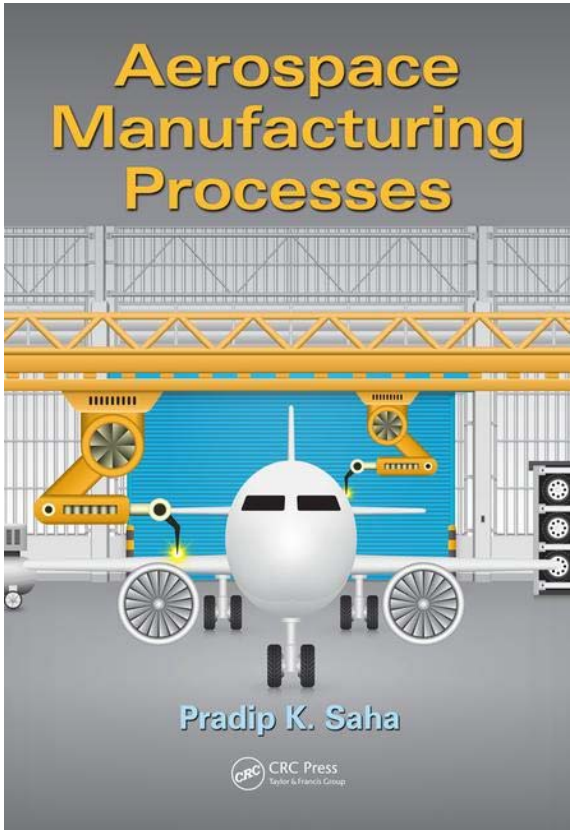
Distance between cities:

70.7mi | 1.25hours



Contemporary Challenges

- Numerous processes associated with either aircraft assembly or component manufacture are carried out manually
- Adoption of additively manufactured components can progress more rapidly
- Inspection techniques are limited
- More to come



www.crcnetbase.com.ezproxy.net.ucf.edu/isbn/9781498756051 (Download the book)

Colaborative automation to prepare kit of parts for assembly

To develop a solution to get the selected material from warehouse and to prepare the kits of parts to deliver to the shopfloor.

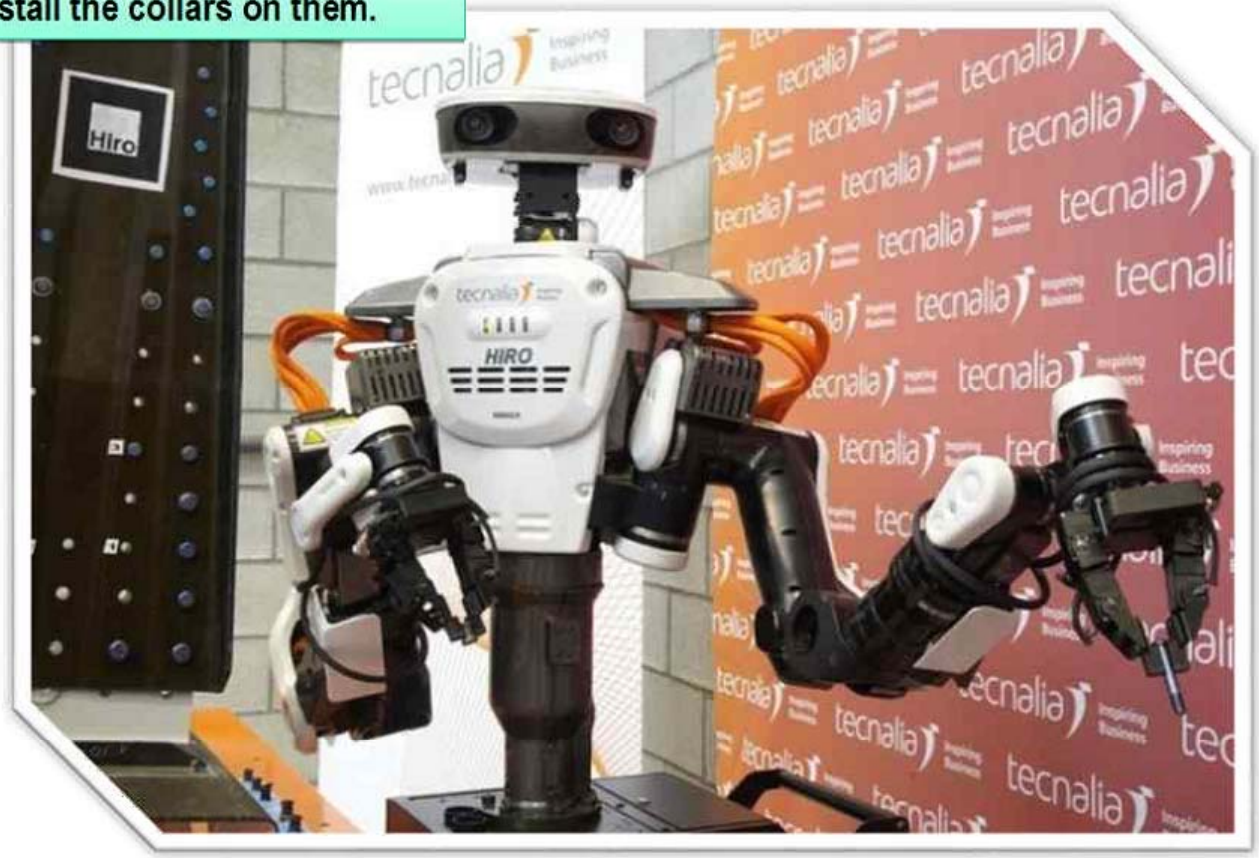
Current Process:
- Manual
- Corporative
- High volume of material and kits
- Several different type of small parts

Desired Process:
- Easy programming
- Integrated to the MRP

To develop a solution to automatically identify the fastener type already installed and to install the collars on them.

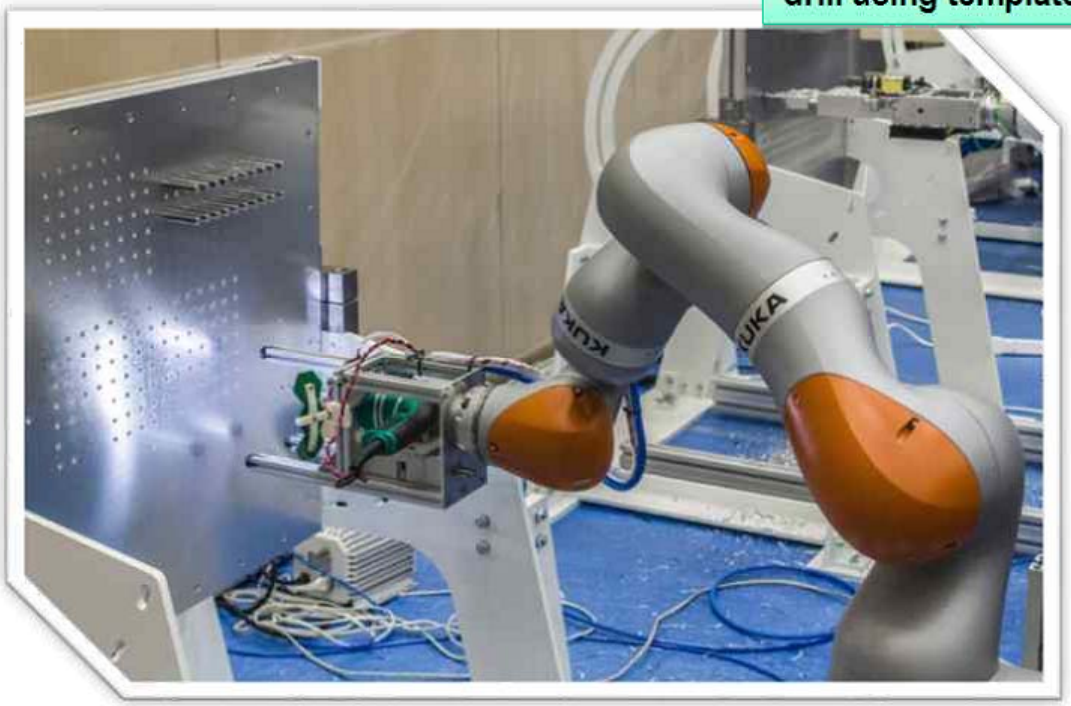
Current Process:
•Manual

Desired Process:
•Easy programming
•Portable and movable
•Work with different sizes and diameters of fasteners (HST)



Colaborative automation for handling drilling machines

To develop a solution to position drilling machines to drill using templates for different products.



Current Process:

- Manual drilling

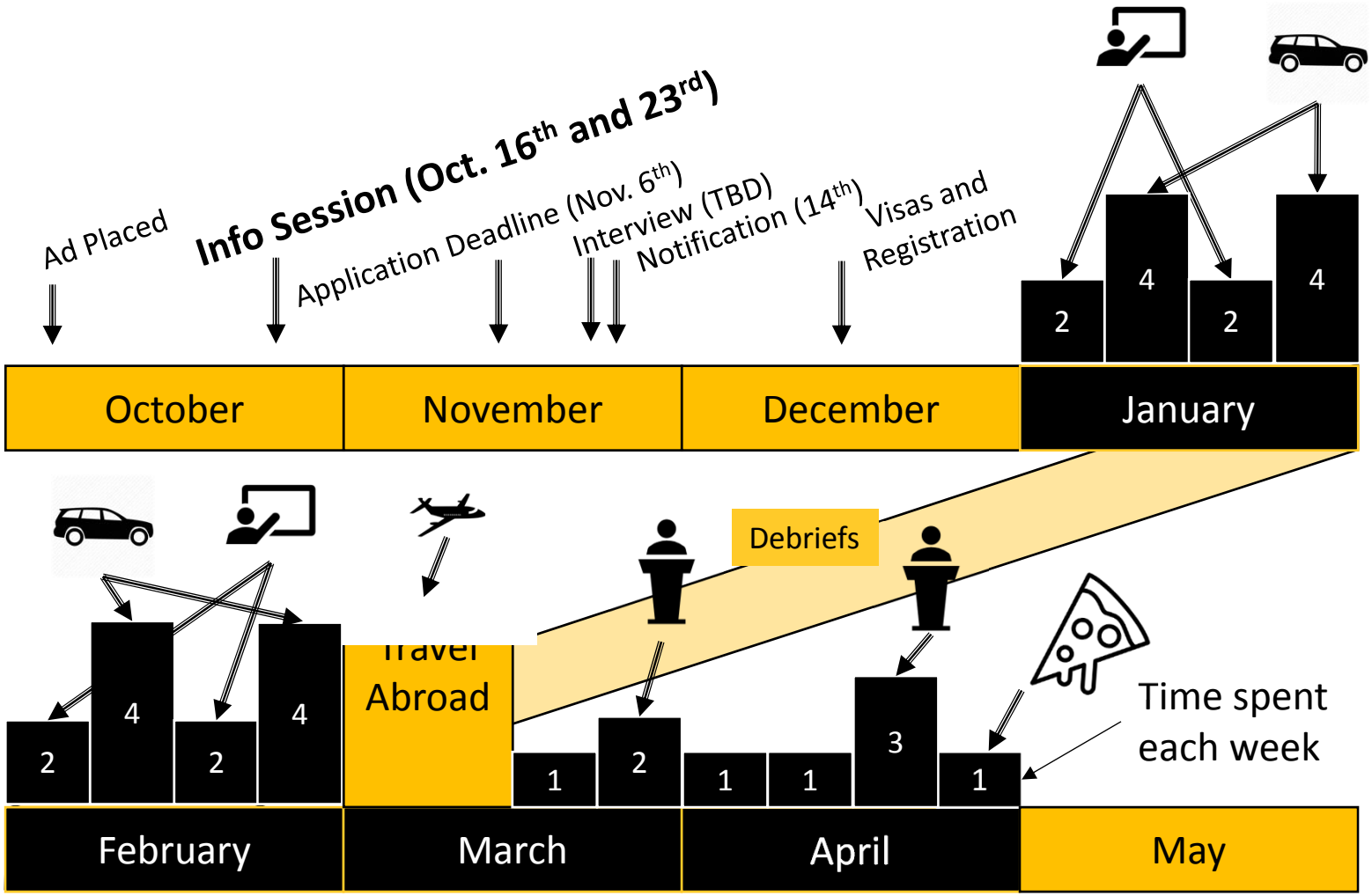
Desired Process:

- Easy programming
- Portable and movable
- Precision of positioning to match the templates
- To drill according Embraer quality requirements

EAS 3955H - Contemporary Challenges in Manufacturing Aerospace Platforms

- The course is under consideration for 3hour credit towards B.S. in Mechanical or Aerospace Engineering
- Replace a variety of MAE Approved Electives
  - http://mae.ucf.edu/academics/undergraduate/undergraduate-technical-electives/
  - Examples: EAS 3101 (Aerodynamics); EMA 3124 (Design and Selection of Materials)
- ~~Requires C or better in EGM 3601 (or possibly have EGM 3501H as a co-requisite | offered in Spring 2018)~~
- Fridays 2:00 to 4:20 PM

Key Dates (2018-2019)



https://honors.ucf.edu/person/austin-searles/

From Here to Embraer (Year I) Projects

- Bio-diesel for aircraft
- Application of nuclear for aircraft
- Additive manufacturing of aero-structures
- Application of Digital Twin in Executive Jets
- Artificial Intelligence in Aircraft
- Vertical Take-off and Landing Vehicles
- Non-Destructive Evaluation Methods
- Electric Propulsion

By the Numbers

- Before primary travel in the course commences (Spring Break 2019), the course will meet face-to-face for lecture | **Duration: Average of 2 or 3 hours per week.**
- In some weeks (5 or 6 weeks), the course will meet for hands-on activities at airport hangars, manufacturing plants, inspection facilities, etc. | **Duration: Average of 4 hours per occasion.**

Duration of Spring 2019:
16 weeks

Total hours spent:
Lecture: 16
Hands-On: 16+30

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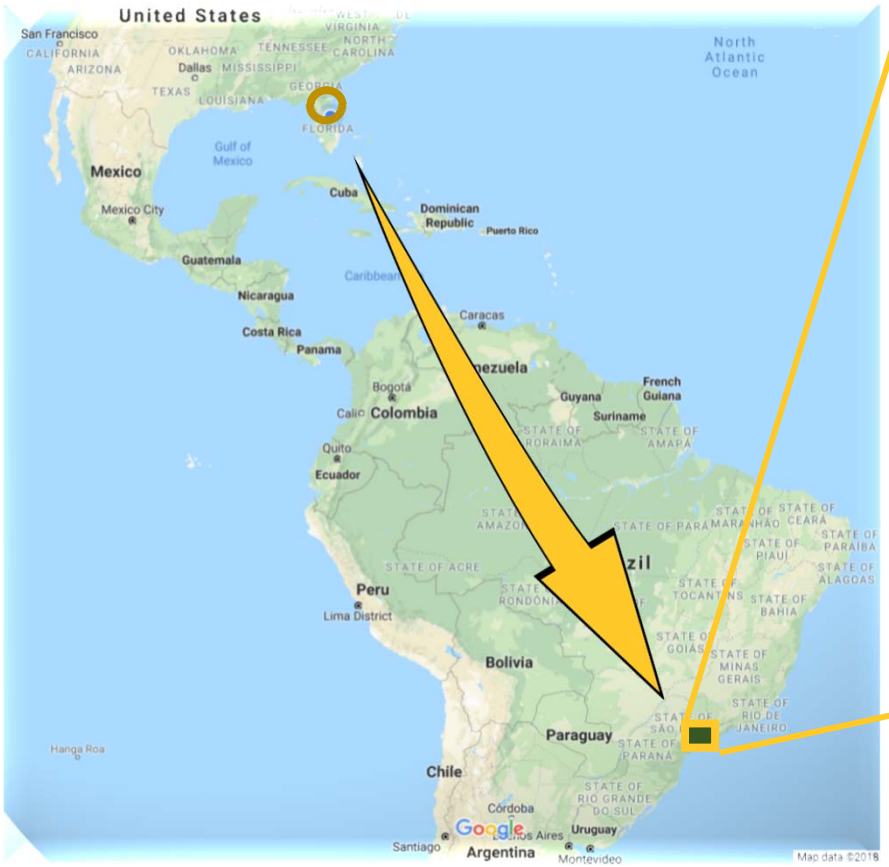
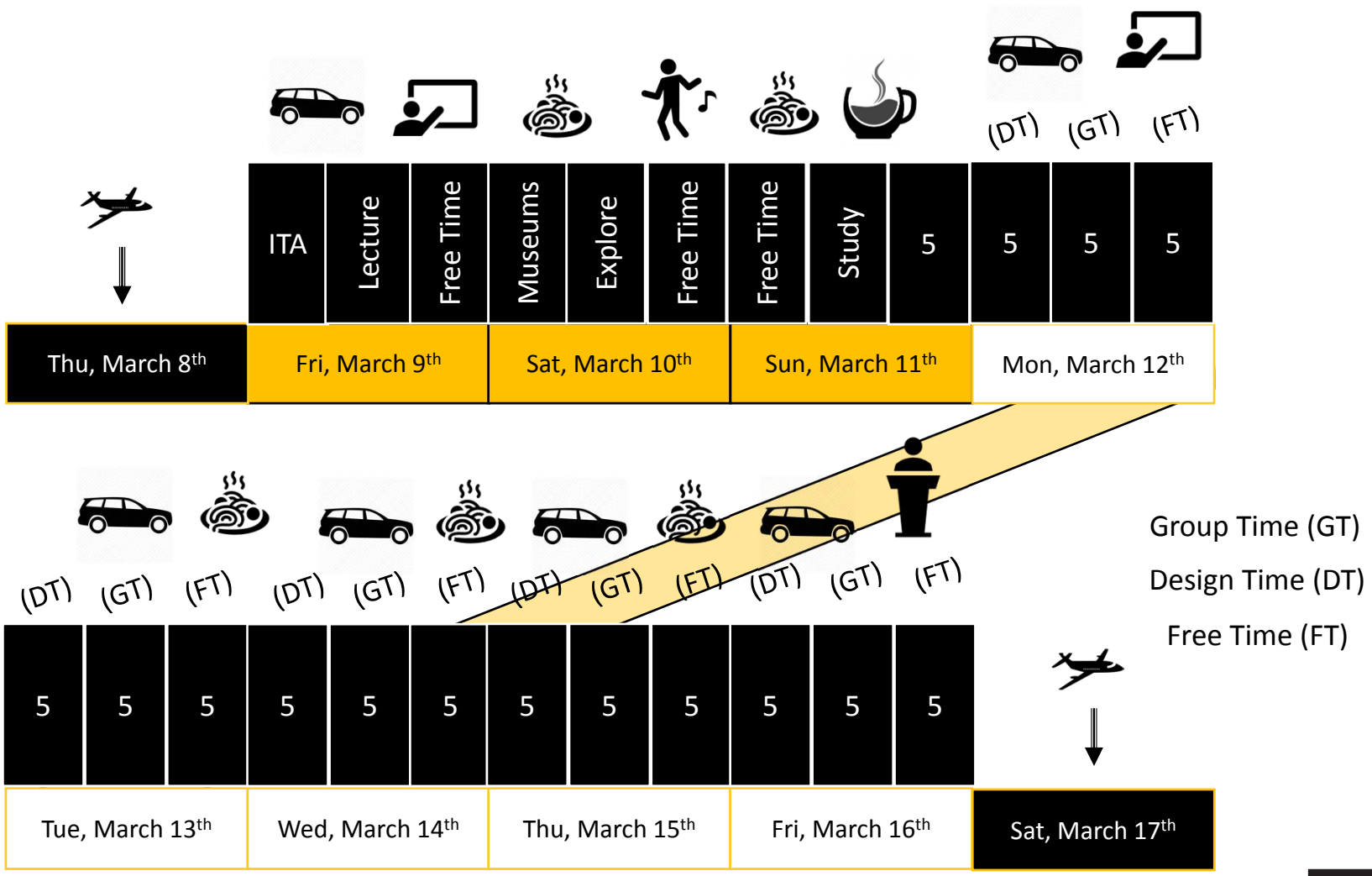
Sao Paulo, State of Sao Paulo, Brazil

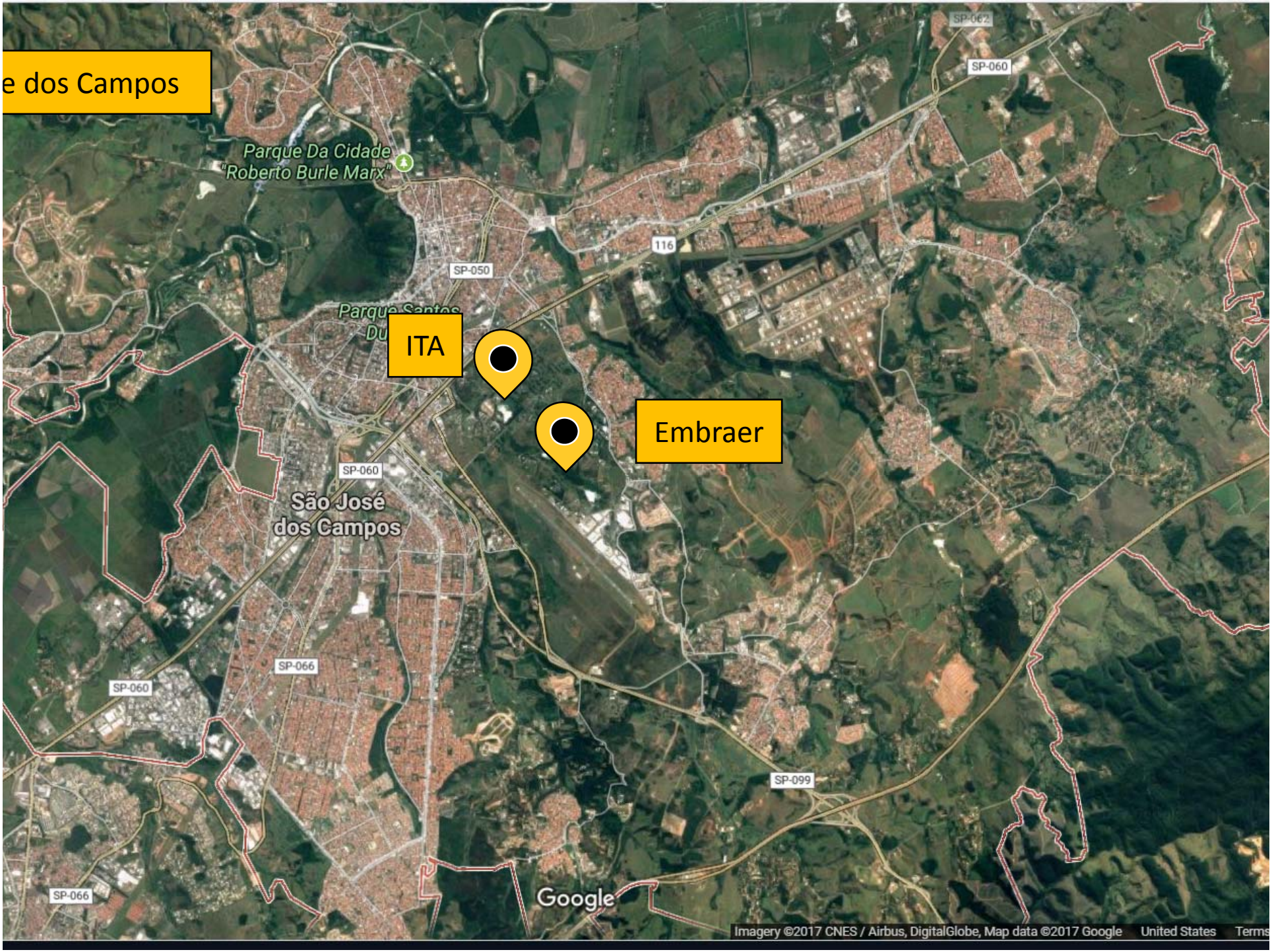


Flight:
4,275mi | 8.6hours (non-stop)

Distances between cities:
89.3km | 2hours

In-Country Itinerary (Pre-Version 2017)




e dos Campos
Parque Da Cidade
"Roberto Burle Marx"
SP-062
SP-060
116
SP-050
ITA
Embraer
SP-060
São José
dos Campos
SP-066
SP-060
SP-099
SP-066
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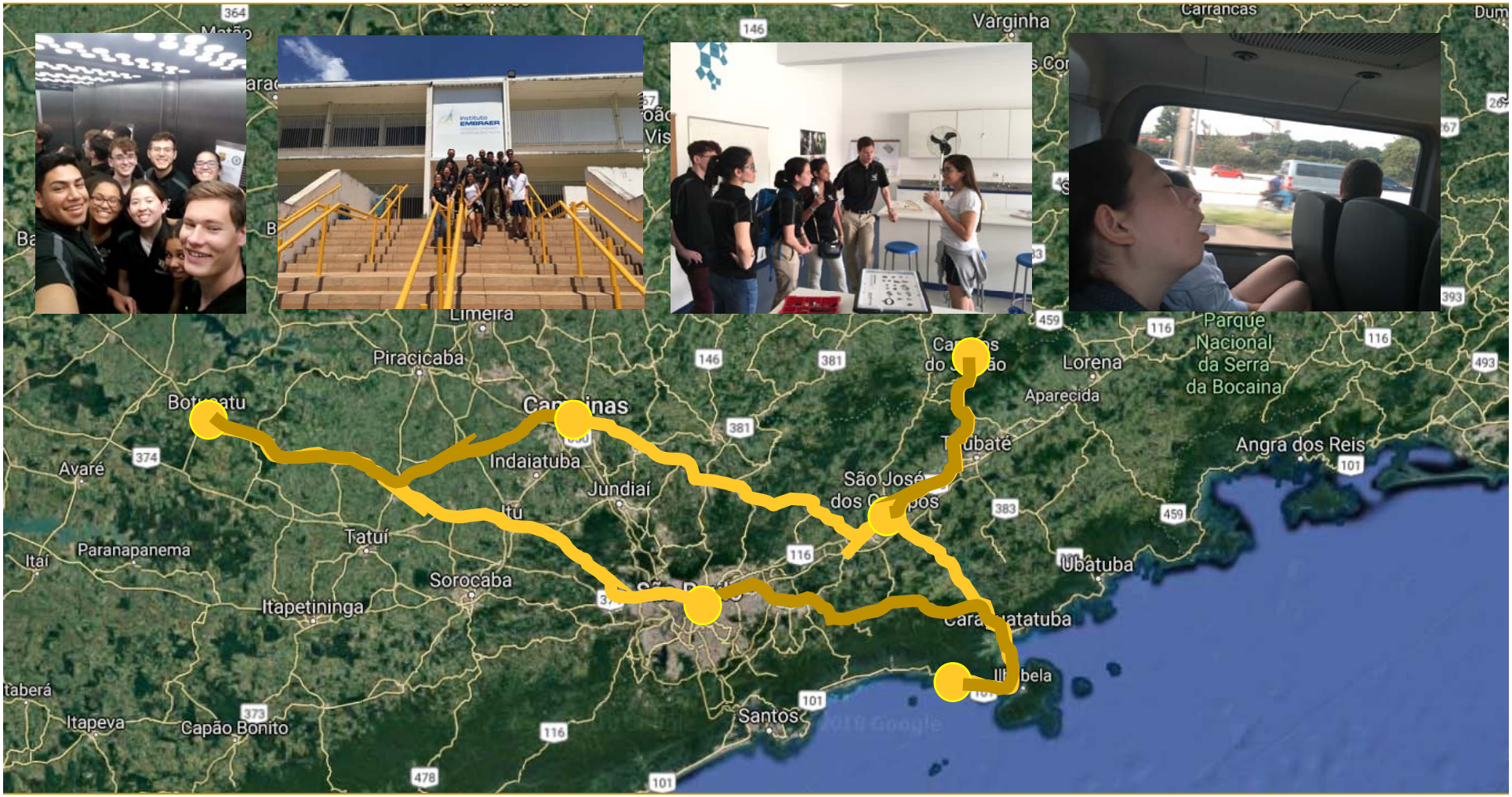
Terms

Instituto Tecnológico de Aeronáutica (ITA)

- Institution of higher education and advanced research emphasizing aerospace science and technology
- 1.12% acceptance rate
- BS, MS, and PhD programs
- **Notable Alumni:** CEO of Embraer and First Brazilian Astronaut

In-Country Roadmap

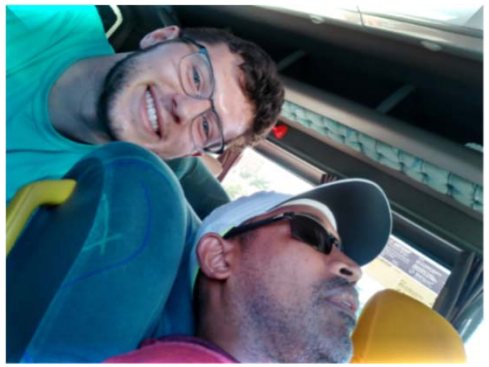


Participant Costs

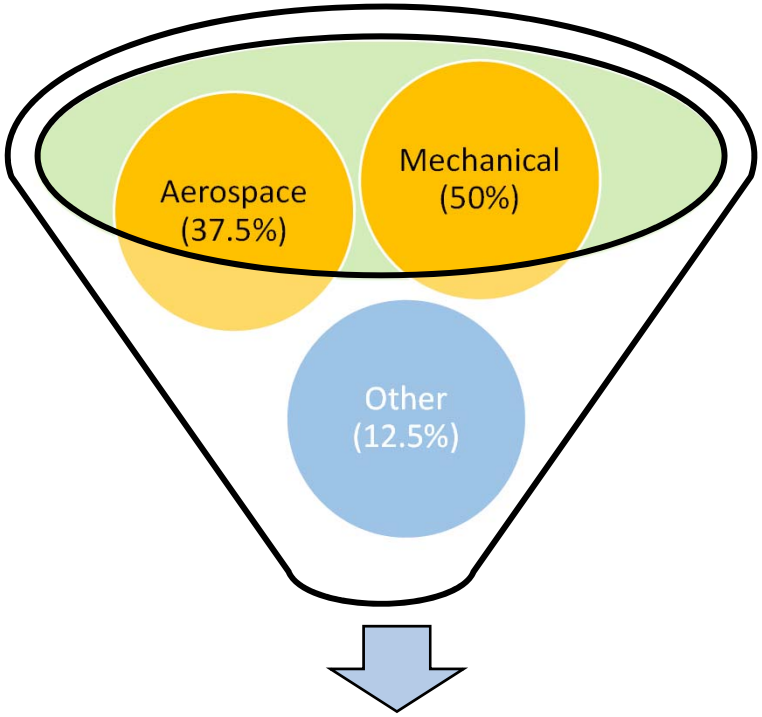
- The cost of the program for each student consists of airfare, in-country ground transportation, lodging, most meals, and some excursions. The stated program cost is ~~$3,000~~ **$2,500/student**.
- **The Burnett Honors College Students: TBHC pays $1,000 and scholarships are available**
- Please note that while unlikely, the program cost is subject to change due to changes in airfare and exchange rates.
- Students should bring some pocket money for snacks, non-group meals, and souvenirs during our excursions.
- Students with financial limitations can apply for scholarships (honors.ucf.edu/students/study-abroad/study-abroad-scholarships/).

This Course is Right for You If You…

- ✓ …are interested in learning more about the aerospace and/or manufacturing industries
- ✓ …love airplanes (https://www.youtube.com/watch?v=HDTCp4L4Dw4)
- ✓ …have a desire to study abroad, but may not be able to commit to a full semester away from campus
- ✓ …are interesting in exploring new cultures
- ✓ …are interested in a balanced academic and professional course
- ✓ …want to build lasting friendships/contacts
- ✓ …are curious to see what faculty and staff are like outside of their academic habitat



Student Profile

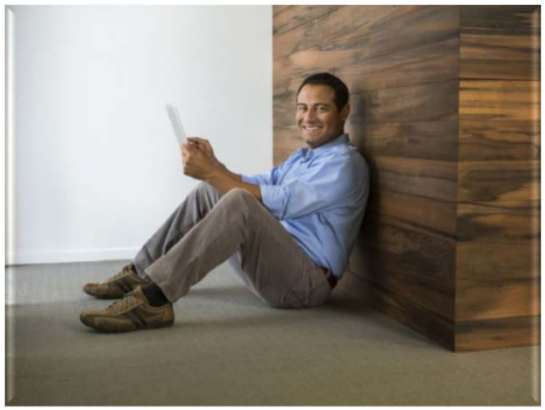


8 Students

- **Expected graduate dates:**
  - Spring 2018 (1 out of 8)
  - Spring 2019 (2 out of 8)
  - Spring 2020 (3 out of 8)
  - Spring 2021 (2 out of 8)
- **Software Experience:**
  - Solidworks, Pro-E, ANSYS, Siemens NX
  - Matlab, MathCAD, etc.
  - AutoDesk, Sketchup, etc.
- **Language Proficiency**
  - Spanish (Reading)
  - Portuguese (12.5% students fluent)
- **Academics**
  - GPA (very high)
- Interest in internships (very high)
- More to come

What to Bring?

- Passport
- Tablet or very small laptop with MS Office
- UCF Gear
- Attire respectable to the company (Business casual workplace)
- Water bottle
- Nintendo switch
- Swimwear



Program Application

- Eligible candidates must be in good standing
- Applicants for this program should complete this application form and submit all supporting materials no later than 12 noon on November 6, 2018.
- All materials must be checked off before turning in.
- Supporting materials must include all of the following:
  - Application form, completed and signed.
  - Permission is given to the Honors College to review your academic transcript.
  - A cover letter describing your interest in applying to this program and your goals for studying abroad and your resume.
  - 500 word essay
  - A letter of recommendation from a UCF faculty member familiar with your scholastic achievements/potential.
- Must be able to attend spring classes (Friday 2:00-4:20 PM).
- Finalists for this program will be selected on the basis of these materials as well as an interview to be scheduled in the fall (November 14th).
- Questions, please contact:

Dr. Ali P. Gordon at apg@ucf.edu | 407-823-4986

Mr. Rodrigo Lenartowicz at Rodrigo.Lenartowicz@ucf.edu | 407-823-2416

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General Questions for Potential Participants

Questions:	**Example Responses:**
Name:	Ima Knight
Degree Seeking:	BS AE
Expected Graduation Date:	Spring 2019
Languages:	English, Spanish
Traveled to Brazil Before:	No
Software Skills:	AutoCAD
Passport Status:	Don’t have one
How did year hear about it:	Website, Friend

Application Due 12 Noon Nov 6th
Link: https://honors.ucf.edu/wp-content/uploads/sites/2/2018/10/2019-Brazil-Application-updated.pdf

Apply Now!

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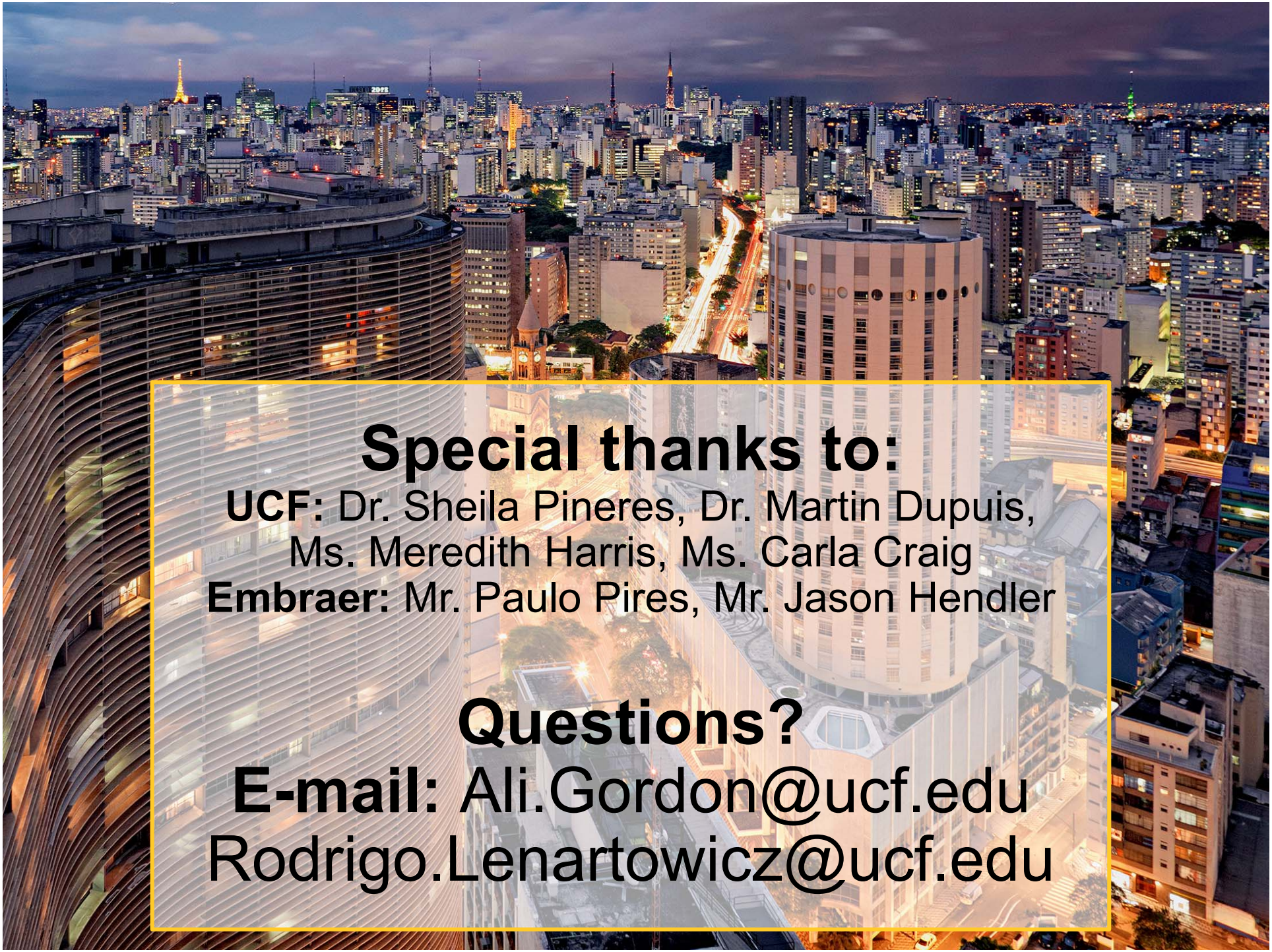

Special thanks to:

UCF: Dr. Sheila Pineres, Dr. Martin Dupuis, Ms. Meredith Harris, Ms. Carla Craig

Embraer: Mr. Paulo Pires, Mr. Jason Hendler

Questions?

E-mail: Ali.Gordon@ucf.edu

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