

SOFIA - „FlyYourThesis“

Junior Researchers Programme on SOFIA

or:

„How can we engage more effectively with the grad-student / pre-tenure scientists“?

Kimberly Ennico Smith

Hans Zinnecker

Clemens Plank

Wissen für Morgen



1.) The Idea & Motivation

- Encouraging motivated Students “to go the Extra-Mile”
- Simplify access to Astronomical Research for students through collaborations with established researches.
- Providing Extracurricular Hands-On experience
- Maintaining a sustainable, excellent Infrared Research-community
- Encouraging kids, teenagers for STEM
- Increasing the visibility of SOFIA to the:
 - General public
 - Science community (“to clear out the grey haze around SOFIA for some scientists”)



2.) Ideas & Opportunities

- SOFIA Summer School
- Invite students to give talks at SOFIA science center workshops (Asilomar Oct. 2018; ALMA Seattle AAS) and pay travel expenses.
- Symposium for Grad students (is there an example we can model?)
- Identify archival products for student research (might be too soon?)
- Sponsored internships for (Instrument-)Engineers: through awarded opportunities (Next Gen call, have to be at the right institution)
- DDT projects for grad students – another proposal type for SOFIA?

SPACE exploration and life science
student event
Raumfahrtzentrum Baden-Württemberg
RZBW Mediathek, Pfaffenwälding 29
February 8, 18:00-21:30

Meet ESA astronaut Herndon Exoat. Hear about space exploration, life on board the International Space Station, the TIME SCALE research project and life science in space. See how **you can participate** in space research. Take your own project into weightlessness and do experiments on rockets and balloons.

Free admission for students at University of Stuttgart
Information and registration: www.timescale.eu
Limited number of participants

Use Stuttgart IRS @stuttgart_irs on Feb. 8th to learn about @REXUSREXUS experiments and enter the TIME SCALE Competition on [lyndal000000](https://twitter.com/lyndal000000) or twitter.com/CyT@uvsb

Summer School Alpbach 2017
The Dusty Universe
July 18-27, Alpbach/Tyrol - Austria

THE SUMMER SCHOOL

Would you like to use engineering and/or science to solve problems that can be addressed by "space missions" if you consider applying to the Summer School Alpbach?

This year, only European engineering and science students will be chosen to participate in the 4th Summer School Alpbach, a one-day morning opportunity held in the beautiful Austrian Alps. Participants will be engaged in an in-depth learning experience. Over two days they will attend stimulating lectures on various aspects of space science and engineering and will work intensely within smaller groups to define and design a space mission under the supervision of noted scientific and engineering experts within the field.

The topic of the Alpbach Summer School 2017 is "Dust in the Universe". Understanding dust, its role in and use as a diagnostic for cosmic evolution has tremendously benefited from space missions covering the electromagnetic spectrum from X-rays to radio wavelengths, and will do so in the future.

Students of the Alpbach Summer School 2017 will be informed about past achievements and current issues, and will be invited to propose ideas to further explore the Dusty Universe.

Four student teams will define the scientific objectives of a space mission and will provide a preliminary end-to-end design of spacecraft, scientific instruments as well as mission and science operations that will meet their stated objectives. You and your team will be responsible for selecting and researching the problem to be addressed by your space mission, for cooperatively working with team members to meet difficult deadlines, and for developing your own working style.

You will be exposed to some real-life challenges, such as 20-hour working

3.) Similar Programs in Europe

- REXUS/BEXUS
 - Organized by DLR + SNSB + ESA
 - Student Experiments on Sounding Rockets & Balloons
 - For Bachelor & Master students
- Spin/Drop/Fly – Your Thesis
 - Organized by: ESA Education
 - Student Experiments on Centrifuges/Droptower/Parabolic Flight
 - For Master & PhD students
- Cubesats (ESA Education)
- ISS-Experiments (DLR – Alexander Gerst)
- ...



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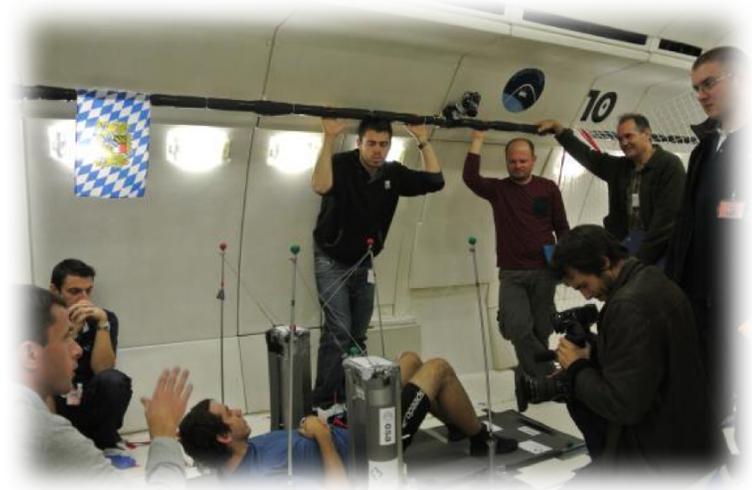
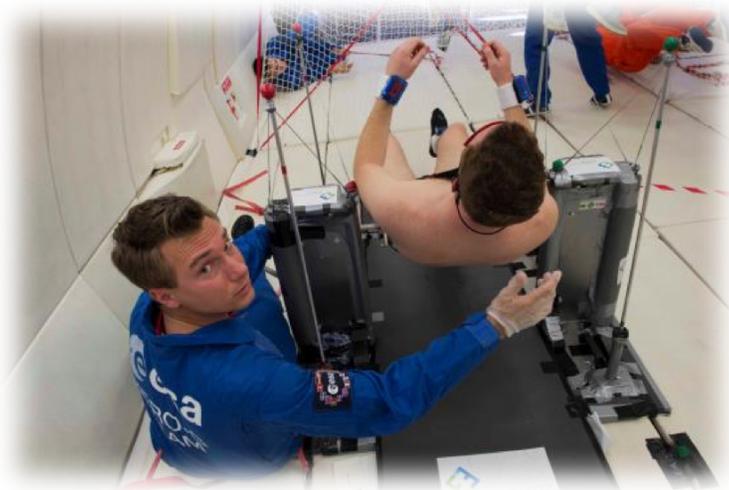


3.) Similar Programs @ NASA

by NASA Office of Education:

- \$8Mio for selected student teams to conduct hands-on flight research
- CubeSats, aircraft, sounding rockets, balloons and other commercial platforms
- NASA Student Airborne Research Program (SARP 2017) – by AFRC & Earth Science Programm für Grad-Students

https://earthscience.arc.nasa.gov/nsrc/content/National_Suborbital_Research_Center_SARP_2017



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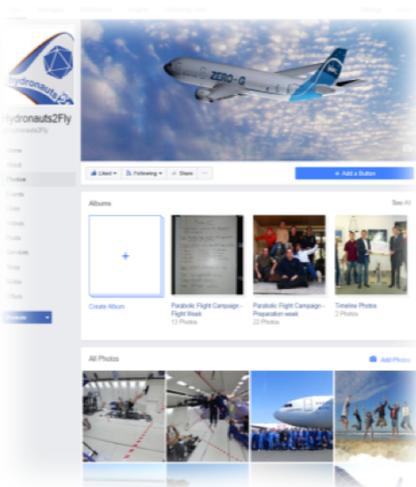
4.) TAC cycle for Junior Researchers

- a. 1st Application Phase: (e.g. June + July)
 - Students (Student Teams) submit their application documents (standardized Formulas and Questionnaires with predefined questions on their scientific proposal – similar to current TAC for senior Scientists)
- b. 1st Selection Round (August + September)
 - Identifying potential and feasible proposals → Feedback to students about required adjustments of their proposals in order to increase their chances to be finally selected.
 - Letter of Refusal to the Rest
- c. 2nd Application Phase (October)
 - Students adjusted their proposal accordingly (if they can accept the requests) and submit it again with more detailed application documents until the new deadline.
 - Request to also submit Flight Medical formulas!
- d. 2nd Selection Round (November)
 - Selection committee invites the best (10?) Proposals to a final Selection workshop (in Stuttgart/Bonn & AMES/AFRC/Washington).
- e. Selection Workshop (1day in early December)
 - Students present their proposal to the selection committee and answer critical questions about their scientific intention and thesis.
- f. Announcement of the final 4(?) proposals (December)
 - integrating it to the SOFIA-Flightplan
- g. SOFIA – observation flight (January – July)
- h. Data calibration - Scientific evaluation - completing the Thesis (until December)



5.) Benefits for the SOFIA - Programme

- Unbiased ideas from students as potential for established Astronomers
- Involving the (new) Institutes of the students for future SOFIA activities
- Student campaign should not be seen as competition but as collaboration.
 - „Mentoring“ and talent support!
- Increasing awareness of SOFIA and spreading enthusiasm for STEM
 - Education as another political factor for SOFIA-funding!



6.) Estimated Costs

Per US-Student: ca. \$3.000,-

- Travelling to selection workshop (transportation \$400 + hotel \$100)
- 2 week Flight campaign in Palmdale (transportation \$400 + rental car \$900 + Hotel \$1200)

Per German/European-Student: ca. \$3.500,-

- Travelling to selection workshop (transportation \$300 + hotel \$100)
- 2 week Flight campaign in Palmdale (transportation \$1000 + rental car \$900 + Hotel \$1200)

No funding of their research thesis itself! If required this must be ensured by their home institute!

Expenses for European students might be covered by ESA.



7.) Next Steps & Barriers?

- GIs say it's "too risky" for a student to use SOFIA (not reliable enough)
 - What do the Sounding Rocket / Balloon programs do? Do they have similar "luck" criteria?
- GI's may not have enough funding for the grad student to actually assist in taking the data.

Countermeasures:

- Lower barriers to GIs: Offer additional seats/time for grad students to fly on SOFIA ("Cycle 6 Student Package")
- Invite students to come to SSC to plan or reduce their observational data
- NASA personnel co-mentor with US/German Universities (USRA?) through the GSRP/Graduate Student Research Program



7.) Next Steps & Barriers? Cont'd.

- Which Instruments can be used?
 - Only Germans? Only US? All?
- Initiating a first call only within Germany? Only USA? Europe + USA? Worldwide? → expensed must be covered by national space agency then!
- ...

