



1211 West 22<sup>nd</sup> Street, Suite 900 • Oak Brook, IL 60523 USA  
T: +1 (630) 928-1400 • F: (630) 928- 1559 • [www.zonta.org](http://www.zonta.org)

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## Amelia Earhart Fellowship Program

### A Zonta International program, funded by the Zonta International Foundation

The Zonta International Amelia Earhart Fellowships were established in 1938 in honor of Amelia Earhart, famed pilot and member of the Zonta Clubs of Boston and New York. The Fellowships are made annually to women pursuing graduate PhD/doctoral degrees in aerospace-related sciences and engineering.

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### 2009 FELLOWS

#### **MORGAN CAITLIN BALDWIN**

- Citizenship: USA
- Proposed Program: Aerospace Engineering at Iowa State University

Ms. Baldwin will use her fellowship to develop a mathematical formulation to optimize complex mission planning to and/or from space. The mission scenarios she is considering can consist of all segments of launch, on-orbit, and hypersonic entry flight. The applications could include crew vehicle launch aborts, hazard avoidance in planetary landing, and autonomous explorations of Mars. The formulations and solution of these problems require tools from applied mathematics, flight mechanics, and aerospace mission planning. Ms. Baldwin tutors women in science and engineering and is very interested in increasing women's roles in these fields. She is a brown belt in Tae Kwon Do and is studying for her black belt.

#### **AMIRA BARHOUMI**

- Citizenship: Tunisia
- Proposed Program: Aerospace Engineering at Texas A&M University

Ms. Barhoumi will use her fellowship to research enhancing aircraft and spacecraft design by engineering lighter, tougher and safer materials; namely polymers and nanocomposites. Conventional polymer composites are a major material used today in high performance aircraft and the next generation of polymer nanocomposites promise even more improved properties. Her current project consists of the characterization and the dielectric and electrical properties of polymer nanocomposite films. She has engaged in both experimental and modeling studies. Ms. Barhoumi likes to read scientific reviews and the international news.

#### **LAURA BETH BROWER**

- Citizenship: USA
- Proposed Program: Aerospace Engineering at the University of Colorado at Boulder

Ms. Brower will use her fellowship to continue her studies in atmosphere/space boundary, including a planet's ionosphere and magnetosphere. The study is important to the success of satellites and spacecraft, the interpretation of ground-based and remote-sensing observations and the transmission of certain types of communication. Her research employs a comparative study of the atmosphere/space system among Earth and

other planetary bodies, particularly Jupiter and Saturn. In the case of Jupiter the ionosphere serves as a giant electric generator or dynamo. Modeling efforts have permitted the discovery of significant increases in dynamo strength that can raise electron temperatures, noticeably modifying ionospheric conductivity at between 80 and 120 km altitudes above Earth. The model will be expanded and applied to other planetary bodies. Ms. Brower enjoys tutoring young students in the community, playing the flute, rock climbing and traveling abroad.

### **CÉLINE CASENAVE**

- Citizenship: France
- Proposed Program: Aerospace Engineering and Applied Mathematics at LAAS-CNRS-Toulouse, France

Ms. Casenave will use her fellowship to research the problems of reducing the noise generated by aircraft engines. She is engaged in modeling complex aeroacoustic waves and identifying these models from measurement data. Her goal is to develop concrete and easy to implement methodologies, which will lead to practical design of noise reduction materials. These materials include specific absorber materials, which could cover the engine walls. Ms. Casenave belongs to an organization that protects animals and is a member of its management committee. She also tutors children who have difficulties in school.

### **LUCY ELIZABETH COHAN**

- Citizenship: USA
- Proposed Program: Aeronautics and Astronautics at the Massachusetts Institute of Technology

Ms. Cohan will use her second fellowship to continue her studies on advancing the technology for improving the performance of large space telescopes. Her research focuses on parametric and integrated modelling of space telescope systems. Ms. Cohan has created a finite element model to determine stress outputs due to vibrational and acoustic launch disturbances. She will be working on disciplines to improve structures, optics and controls. After graduation Ms. Cohan intends to continue in research and development. She enjoys swimming, hockey, waterpolo, running, hiking and being outdoors.

### **DIANE ELIZABETH CRAIG DAVIS**

- Citizenship: USA
- Proposed Program: Aeronautics and Astronautics at Purdue University

Ms. Craig's thesis is in the field of interplanetary spacecraft mission design. Her main focus on the development of a strategy that facilitates the design of a series of flybys in a multi-body model, which is one of the major challenges in the design of missions such as Galileo and Cassini. The inclusion of multiple gravity fields in the design of flybys significantly complicates the problem, but also may extend the life of a spacecraft by reducing the amount of fuel expended on a certain tour, or through the inclusion of entirely new mission possibilities. She will combine the knowledge of the influence of solar gravitational perturbations with flybys in a multi-body system and ultimately result in a procedure to design an end-to-end trajectory involving multiple flybys of various moons in a multi-body model. Ms. Craig is interested in foreign languages and travelling. She also enjoys hiking and photography.

### **ANTJE DECKERT**

- Citizenship: Germany
- Proposed Program: Aerospace Engineering at the Technische Universität Dresden

The objective of Ms. Deckert's work is to develop a model for rotating space components that are suspended by magnetic bearings. These suspension systems yield significant advantages concerning mechanical wear as well as noise and vibration characteristics. It is important to minimize these problems in spacecraft, which must have long lifetimes and high pointing accuracy. Currently there is no model that considers the complex interactions of electromagnetics, rotordynamics, thermodynamics, materials science and control algorithms. Her work will lead to the optimized design of these magnetically levitated rotors. Ms. Deckert enjoys playing the violin, flute and badminton.

### **ERIN DIANE FARBAR**

- Citizenship: Canada
- Proposed Program: Aerospace Engineering at the University of Michigan

Ms. Farbar is using her second fellowship to develop computer simulation methods for analyzing spacecraft entering the Earth's atmosphere at high speeds, such as those returning from the Moon or Mars. Understanding the plasma formation and aero thermal environment associated with these re-entries is crucial for the design of future space vehicles. The types of flow conditions encountered are difficult to reproduce experimentally and it is necessary to develop accurate and robust modeling tools. After receiving her first Amelia Earhart fellowship, Ms. Farbar has successfully implemented models for charge neutrality, charged species molecular interaction and chemistry, and boundary conditions into the DSMC code called MONACO. She is working to improve the Direct Simulation Monte Carlo (DSMC) chemistry model by incorporating accurate computational and experimental cross section data for reactions involving charged species into the DSMC model. Ms. Farbar is involved in recruiting students into engineering fields of study, and participates in marathons.

### **CATHERINE SIENA FLORIO**

- Citizenship: USA
- Proposed Program: Mechanical Engineering at the New Jersey Institute of Technology

Ms. Florio will study human bone load-induced remodeling in conjunction with mathematical determinations of physiological forces through motion analysis. A computational modeling technique is proposed that couples these two areas, which have so far only been studied separately. The goal is to be able to structure exercises in microgravity environments to maintain bone strength, especially in areas most prone to fracture. Ms. Florio enjoys running, reading and crocheting.

### **BENEDETTA GIULIA FRANZELLI**

- Citizenship: Italy
- Proposed Program: Fluid Dynamics at Institut Polytechnique de Toulouse, France

Ms. Franzelli will use her fellowship to improve the numerical simulation of two-phase turbulent combustion in aero-engines/propulsion systems. Her work is part of a team project called AVBP, devoted to the development of a numerical tool for the simulation of propulsion systems. Her contribution will be the improvement of the description of the chemistry involved in combustion. She will propose, evaluate, test, validate and apply practical systems model for the description of complex chemical kinetics in the AVBP tool. At the conclusion of her studies she hopes to return to Italy to continue her work. In her spare time, Ms. Franzelli does volunteer work for an association called ABIO (Italian association for children in hospitals). She enjoys reading literature (Latin and Greek poems), travelling, cycling and archery.

### **LAURA JUNE FREEMAN**

- Citizenship: USA
- Proposed Program: Statistics at Virginia Tech

Ms. Freeman will use her second fellowship to continue her PhD on modeling reliability data resulting from experiments on jet engines. She is focusing on response surface methodology techniques for reliability and risk analysis in engineering applications, such as jet engines. With her undergraduate degree in aerospace engineering and her Masters degree in statistics, she is in an excellent position to contribute in innovative ways to improving experimental designs and corresponding analyses that give an experimenter the most amount of information for their money when testing jet engines. Since receiving her first Amelia Earhart fellowship, Ms. Freeman has focused on Weibull data analysis, a common distribution used to model reliability data in engineering fields. She has acted as Interim Director of the Statistical Consulting Center at Virginia Tech, a position usually held by a faculty member. She is also a leader in many graduate student organizations and enjoys teaching.

### **KATHERINE JENNIFER HARRIS**

- Citizenship: Canada
- Proposed Program: Geobiology at the Massachusetts Institute of Technology

Ms. Harris will contribute to our understanding of the history and evolution of life on Earth, and ultimately inform the search for biosignatures on Mars and worlds beyond. Her thesis is entitled “Linking fossil fats to modern physiology...” and her focus is on understanding the physiological function of a genetically tractable microbe, *Rhodospirillum rubrum*. This research could ultimately yield insight into the metabolic and environmental conditions present on Earth. As an aspiring geobiologist and astronaut, Ms. Harris’ research enables her to straddle the disciplinary division between biology and geology and ultimately between Earth and Mars. She is involved in science-for-peace initiatives for the Siachen glacier conflict in Kashmir. She is also a member of the Explorers Club and Wings World Quest, and is a feature writer for Outpost Magazine, Canada’s top adventure travel publication.

### **CHRISTINE MARILYN HARTZELL**

- Citizenship: USA
- Proposed Program: Aerospace Engineering at the University of Colorado, Boulder.

Ms. Hartzell will use her fellowship to research the dynamics of dust around asteroids. Her PhD will predict the size and velocities of particles levitated by solar radiation pressure, thereby enabling researchers to design micrometeoroid shield to protect spacecraft from the potential hazards of dust. Part of her research will also focus on identifying the conditions under which solar radiation pressure will cause the levitation of dust. The results of her research may also explain observed variations in the spectral signatures of asteroids. Her topic is therefore uniquely capable of both contributing to scientific understanding and influencing technology development. Ms. Hartzell has been the chair of Georgia Tech’s middle school tutoring program and is currently the community outreach chair for the CU Aerospace Graduate Student Organization. She enjoys dancing, horseback riding and learning languages.

### **ELIZABETH ELEANOR CAMPBELL JENSEN**

- Citizenship: USA
- Proposed Program: Aerospace Engineering at Princeton University

Ms. Jensen’s goals are to design and build high contrast instrumentation to enable direct detection of exoplanets, focusing on the detection of gas-giant exoplanets. Her research will help to determine whether

our own solar system is an anomaly or a common occurrence. The results of her research can be applied to several fields that use high contrast imaging such as telecommunications and remote sensing applications. After her PhD, Ms Jensen hopes to become a professor. She is Principal Oboe in the Princeton Orchestra, is a member of the Society of Women Engineers, and a member of Smith College. She was also on the Smith College golf team and the New Hampshire Softball team in 2002-2003.

### **ELSY KADDOUM**

- Citizenship: Lebanon
- Proposed Program: Computer Science/Artificial Intelligence at the University of Paul Sabatier in Toulouse, France.

Ms. Kaddoum is studying complex problems in the aeronautics domain such as the design of an aircraft and air traffic control. Her thesis will propose new methods to resolve these problems using an auto-organized multi-agent systems approach. She is planning to use the fellowship for: attending world class conferences on complex systems and problem solving, joining leading groups, and improving her results and publications by studying different applications. Ms. Kaddoum enjoys tennis, swimming, classical music and dancing.

### **NINA LOUISE LANZA**

- Citizenship: USA
- Proposed Program: Earth and Planetary Science at the University of New Mexico

Ms. Lanza will use her second fellowship to continue her studies in understanding the role of evaporates on the Martian surface. Her focus is on the Laser Induced Breakdown Spectrometer (LIBS) component of ChemCam, an instrument to be used on the Mars Science Laboratory (MSL) mission, scheduled for launch in 2009. The LIBS is able to detect hydrated Mg-sulfates, carbonates and ice-mineral structures from a distance of over nine meters. That distance requires careful corrections for Mars atmosphere effects. She does this experimentally using a chamber simulating the Martian atmosphere. Ms. Lanza's initial results are promising and she is planning additional experiments that will examine more complicated mixtures of carbonate minerals that will more closely match the predicted compositions of naturally formed rocks on Mars. She is a member of the Quodlibet Early Music ensemble, and enjoys Yoga and Pilates.

### **LENA M. LOPATINA**

- Citizenship: Ukraine
- Proposed Program: Chemical Physics at Kent State University

Ms. Lopatina will use her second fellowship to continue her research on the great enhancement liquid crystal properties in the presence of nanoparticles. Experiments show that addition of nanoparticles into liquid crystal materials enhances properties that can extend the range of possible applications, including those for aircraft displays. Upon completion of her studies, Ms. Lopatina hopes to remain in academia. She is very active in mentoring and supporting undergraduate students at Kent State University, and is also learning how to play the piano.

### **JOLANTA MATUSEWICZ**

- Citizenship: Canada
- Proposed Program: Aerospace Engineering at the University of Texas at Arlington

Ms. Matuszewicz will use her second fellowship to continue her research on the improvement and estimation of orbital debris trajectories and aid the International Space Station to avoid orbital debris collision. She is

currently improving numerical tools for the future. In the past year Ms. Matusiewicz has worked to improve the uncertainty analysis and improve the drag model for the orbital debris dynamics. Her future goal is to expand her work and develop methods to accurately predict asteroid and comet trajectories, and to help plan spacecraft missions. Ms. Matusiewicz is an Amateur Astronomer. She enjoys the martial arts of Judo and Aikido.

### **DEBORAH KATHLEEN MEDUNA**

- Citizenship: USA
- Proposed Program: Aeronautics and Astronautics Engineering at Stanford University

Ms. Meduna is working to extend the research of space exploration by significantly advancing robotic capabilities in remote environments. The isolated nature of space demands reliable vehicle navigation systems that do not depend upon external positioning systems such as GPS. Terrain Relative Navigation (TRN) provides a powerful solution, allowing a vehicle to estimate its position relative to the environment by simply matching terrain measurements with a stored terrain map. Her research will provide a critical step in expanding the autonomy of vehicles in remote environments, increasing their ability to navigate and reason in their surroundings. Ms. Meduna enjoys playing the flute, hiking, traveling and cooking.

### **ANOOSHEH NIAVARANI**

- Citizenship: Iran
- Proposed Program: Mechanical Engineering and Fluid Mechanics at Michigan State University

Ms. Niavarani will use her second fellowship to continue her research of flow behaviour in Micro-fluid devices for aerospace application. Her goal is to understand the specification of the boundary condition of the flow at the solid/liquid interface. Her research implements the molecular dynamics simulation for flow prediction in aeronautical devices such as micro-valves and micro-pumps in propulsion systems. Part of her work is to study the effect of surface roughness, shear rate and pressure on slip boundary conditions. This allows the frictional losses to be reduced while minimizing the device size and input power, which is an ultimate goal for aerospace application. Since receiving her first Fellowship, Ms. Niavarani has studied the effect of slip boundary condition for shear flow of polymer melts past atomically smooth and corrugated surface. Ms. Niavarani enjoys swimming, playing the piano and is an amateur astronomer. She is a member of the Society for Women Engineers, AIAA and APS (Persian Spartan Association) to encourage the youth and women to join the engineering and science fields.

### **JACQUELINE ANTONIA O'CONNOR**

- Citizenship: USA
- Proposed Program: Aerospace Engineering at Georgia Institute of Technology

Ms. O'Connor's PhD research focuses on low emissions gas turbines, in particular the challenge of understanding the combustion dynamics. She will focus on a mode of instability where a circumferential acoustic mode resonates in the combustor. This instability appears in the annular combustors of jet engines and power generation gas turbines. Her research plan will use laser diagnostics and acoustic modelling to characterise the complicated coupling mechanism between acoustics and the combustion process, and thereby generate a complete picture of this complicated phenomenon. Results from her first phase of experiments have revealed interesting behaviour of the shear layer at the flame-stabilization point. She will then use another planar laser technique to visualize the time-resolved evolution of the interaction between the flame and the shear layer. Ms. O'Connor is a violinist with the Galloway String Quartet, is a certified SCUBA Dive Master and mentors undergraduate researchers.

### **MAKIKO OKAMOTO**

- Citizenship: Japan
- Proposed Program: Aerospace Engineering at the University of Texas at Austin

Ms. Okamoto will use her second fellowship to continue her PhD research on the development of new algorithms to coordinate the control of multiple autonomous vehicles during exploration missions. Multi-vehicle cooperative systems are being proposed for upcoming missions, for example NASA's Prospecting Asteroid Mission. She will develop new algorithms to ensure agents perform their tasks and avoid collisions with other agents in unknown dynamic environments. This will involve decentralized control and communication mechanisms for commanding teams of these unmanned systems. Her research will also include simulation studies to illustrate the performance of the resulting algorithms. Since receiving her first fellowship, Ms. Okamoto has worked to critically evaluate existing approaches to determine the best one to employ. She is currently developing new algorithms based on the approach and mathematically proving their validity. Ms. Okamoto's professional goal is to become a researcher in Guidance and Control, either in industry or academia. She enjoys traveling, playing the piano and violin, and performing the Japanese tea ceremony.

### **ANN MARTHA OLLILA**

- Citizenship: USA
- Proposed Program: Earth and Planetary Science at the University of New Mexico

Ms. Ollila will use her fellowship in the study of capabilities of Laser induced breakdown spectroscopy (LIBS) to detect and quantify carbon, nitrogen, carbon-carbon (CC), carbon-nitrogen bonds, and the hydration of smectite clays. These conditions are likely to be encountered by the Mars Science Laboratory (MSL) rover. The organic molecules listed are essential clues to past environments and habitability. She intends to participate in the MSL rover mission at the Jet Propulsion Laboratory or at the Centre d'Etude Spatiale des Rayonnements in Toulouse, France. Upon graduation she hopes to pursue a career as a research scientist. Ms. Ollila's spare time is taken with home renovation, gardening and landscaping.

### **JULIE MARIE JONES PARISH**

- Citizenship: USA
- Proposed Program: Aerospace Engineering at Texas A&M University

Ms. Parish will use her second fellowship to continue her research in the study of advanced air and space vehicle dynamics and new methods of vehicle control. In addition to her research, Ms. Parish is involved in a NASA project to use star images to determine coordinates extending the concept to extraterrestrial sites, such as Mars. She has been involved with theory development, system integration, experimentation and data

analysis. Her goal is to have a career in Aerospace research. Ms. Parish enjoys gourmet cooking, reading (especially Jane Austin), traveling and sports.

### **BHARANI PRIYA RAVISHANKAR**

- Citizenship: India
- Proposed Program: Mechanical Engineering at the University of Florida

Ms. Ravishankar is working toward developing a Multifunctional Integrated Thermal Protection Systems (ITPS). This would be a composite where the load bearing structure of the spacecraft was combined with the Thermal Protection System TPS. The TPS is the “heat shield“ system on a spacecraft that protects the vehicle from extreme temperatures and thermal loads. The objective of her work is to formulate a tool, which would make the probabilistic optimization computationally feasible. Ms. Ravishakar is involved in volunteer work for educational causes and is a member of the world Tae Kwon Do Federation.

### **DASIA ANN REYES**

- Citizenship: USA
- Proposed Program: Aerospace Engineering at Texas A&M University

Ms. Reyes will use her fellowship in the study of fluid dynamics, specifically the accurate modelling of turbulence, which causes significant problems in air and space vehicle design. Turbulence also plays a significant role in the combustion engines of aircraft. Her research is important to overcome the limitations of current technology and allow engineers to develop safer and more efficient engine and vehicle design. Upon graduation, Ms. Reyes hopes to work as a fluid dynamics specialist in turbulence modelling. She enjoys country and western dance, and is a member of the Texas A&M women’s rugby club.

### **JOANA LUIZ TORRES DA ROCHA**

- Citizenship: Portugal
- Proposed Program: Aeroacoustics and Aerospace Engineering at the University of Victoria, BC, Canada

Ms. Rocha will use her second fellowship to develop coupled aerodynamicstructural-acoustic analytical models to predict the sound and vibration levels inside aircrafts for turbulent-boundary-layer induced noise. With her first Amelia Earhart fellowship, Ms. Rocha developed analytical and computational models to describe the sound field inside an aircraft cabin. She will continue her studies involving aerodynamics, structures and acoustics. Her objective is to develop usable, accurate methods to reduce noise levels by creating a control system and optimization loop to place sensors and actuators on the aircrafts structure to reduce its vibration. Ms. Rocha enjoys cycling, Yoga, painting and gardening.

### **MAGDALENA TRAIKO SANDOR**

- Citizenship: USA
- Proposed Program: Physics and Astronomy at the University of North Carolina at Chapel Hill

Ms. Sandor will use her fellowship to study bulk metallic glasses (BMGs) using nuclear magnetic resonance. BMGs are frozen metallic liquids with great potential for future aerospace engineering. They possess unique properties such as lightweight, high yield strength and self-healing ability. Her current work on Al-based BMGs offers promising results. Her research program will entail studying the lightweight BMGs that show high strength and promising glass forming ability (GFA). Ms. Sandor enjoys building electronic circuits, studying Eastern European culture and languages (Macedonian, Serbian, and Croatian).

### **SWATI SAXENA**

- Citizenship: India
- Proposed Program: Aerospace Engineering at the Pennsylvania State University

Ms. Saxena will use her fellowship to develop an LES (Large Eddy Simulation) solver for dual-stream jets under the influence of high lifting devices. Her thesis focuses on the design and implementation of a three-dimensional LES solver to compute the flow and the acoustic field around jet engines installed on an aircraft. Ms. Saxena's research will provide improved insights on the noise generation mechanisms from dual stream jets and possible ways to reduce it. She is a member of many Committees, including International Student Council and Services and Engineers for Sustainable World and Society of Women Engineers. Ms. Saxena enjoys volunteering in her school and is an active participant in dramatics and music.

### **LAURA ANN STILES**

- Citizenship: USA
- Proposed Program: Aerospace Engineering at the University of Colorado at Boulder

Ms. Stiles will use her fellowship to study the improvements in remote sensing for space imaging. When working with space imaging, there is a performance limiting tradeoff between high-resolution images and a wide field of view capabilities due to size-limits of launch vehicle capabilities. Ms. Stiles is researching the use of propellantless control to do close formation flying, using electrostatic (Coulomb) forces to control the relative motion of spacecraft. The technique uses no fuel and very little electrical power. Upon completion of her PhD research, Ms. Stiles would like to become a professor of aerospace engineering. She is involved in outreach programs at the university and is learning Spanish and German. She enjoys skydiving, volleyball, broomball, and ultimate Frisbee.

### **PRIYA SUBRAMANIAN**

- Citizenship: India
- Proposed Program: Aerospace Engineering at the Indian Institute of Technology, Madras, India.

Ms. Subramanian's thesis will focus on the study of the thermoacoustic interaction in premixed flames. Gas turbines are ubiquitous in aerospace applications as the primary power source in air breathing engines. Due to increasing demands for cleaner emissions, combustion is made to occur at lean air fuel ratios. However, engines operating in lean premixed range show significant combustion instabilities. She will first develop a simulation to realistically model the physics of the premixed flame response to excitation. The obtained response will then be included in a model of the enclosing acoustic field with bidirectional coupling. Traditional stability analysis fails when applied to thermoacoustic systems as a consequence of the special structure of the governing equations; this is termed non-normality. Ms. Subramanian plans to draw attention to the importance of non-normality in the interaction of premixed flame with chamber acoustics and to use the developed model to understand the occurrence of some of the observed phenomena. She enjoys cooking, riding bikes and reading philosophy and fiction.

### **MONICA SYAL**

- Citizenship: India
- Proposed Program: Aerospace Engineering at the University of Maryland, College Park

Ms. Syal will use the fellowship to work on the "helicopter brownout" problem. Helicopters landing or taking off in arid terrains uplift large clouds of dust, which hinder the visibility of the pilots. The goal of her

research is to devise a methodology to accurately model the rotor aerodynamics (in the ground effect), and particle dynamics (simulate dust clouds) simultaneously. She will develop numerical methodologies based on Lagrangian techniques to simulate particle clouds; however, also different techniques will be explored to reduce the computational cost with minimal loss of accuracy. Ms. Syal is a representative for graduate students in the Aerospace Department at her school. She enjoys table tennis and represented her College at a national level Table Tennis Tournament in 2002.

### **CAROL ELIZABETH THORNTON**

- Citizenship: USA
- Proposed Program: Physics and Astronomy at the University of California, Irvine

Ms. Thornton's research is primarily focused on the super-massive black holes located in the centers of most galaxies. She is studying the underlying structure of active galactic nuclei (AGN) and how black holes and their host galaxies grow over time. Ms. Thornton has used images from the Hubble Space Telescope to determine the morphology of host galaxies (in particular POX 52) and measured the relative luminosities of the AGN and the host galaxy to a better precision than had previously been achieved. She was able to study the most energetic processes that occur very close to the black hole and discovered how rapidly these processes vary in an object of this size. Ms. Thornton is also investigating why some AGN are more obscured than others, which may help understand why scientists see two types of AGN in the universe. Ms. Thornton's goal is to continue research in academia and pursue her desire for teaching and educational outreach. She enjoys skiing, scuba diving and traveling.

### **AURÉLIE VANDE PUT**

- Citizenship: France
- Proposed Program: Materials Science at Institut National Polytechnique de Toulouse, France

Ms. Vande Put is working in Thermal barrier coating (TBC) systems for gas turbine blades. Such systems are developed in order to reach higher temperatures to increase engines efficiency. Her thesis work focuses on understanding Thermally Grown Oxide (TGO) growth, composition and microstructure in order to increase TBC systems lifetime. Ms. Vande Put enjoys running, swimming, reading and the discovery of other cultures.

### **AFIFA ADEL ZAKI**

- Citizenship: Egypt
- Proposed Program: Aerospace Engineering at Georgia Institute of Technology

Ms. Zaki is working on a project to develop an innovative framework for computational fluid dynamics, computational structural dynamics, and computational aeroacoustics for loose and tight coupling. This approach is a truly aeroelastic simulation and is expected to be able to deal with flutter and with flows presenting strong nonlinearities. Her work focuses on the development of a trimming algorithm that is more physics-based rather than the ad-hoc process that is in use at the present time. The method she is developing is promising and if successful, the method will become the standard in the industry. Ms. Zaki enjoys swimming, drawing and collecting coins and stamps from other Countries.