Opportunity Title: Probability Theory, Stochastic Processes and Big Data Analytics
Opportunity Reference Code: AFSTFP-AFIT-2018-B7596

Organization U.S. Air Force

Reference Code AFSTFP-AFIT-2018-B7596

How to Apply A complete application package consists of:

- An application
- A current resume/CV
- Transcript(s) – For this opportunity, an unofficial transcript or copy of academic records printed by the applicant or by academic advisors from internal institution systems may be submitted. **Official Transcripts for Junior applicants must be sent to ORAU directly from the academic institution, including graduation date and degree awarded, and must be provided before the fellowship can begin.** All transcripts must be in English or include an official English translation.
- Three references

Additional documents to be uploaded must be in PDF format in a standard typeface no smaller than 12-point font, 1" margins, and double-spaced.

- Research Proposal (maximum of 10 pages)
- Dissertation Abstract (maximum of 1 page) *not required for Senior applicants*
- Summary of Previous and Current Research (maximum of 4 pages)
- List of Publications (maximum of 2 pages)

If you have questions, send an email to AirForceFellowships@orau.org. Please include the reference code for this opportunity in your email.

Description This research opportunity focuses on probabilistic techniques in Air Force applications such as turbulence estimation, search and detection of randomly moving multiple targets, sensor fusion, and nonstationary signal detection. We are interested in modern techniques in stochastic analysis for random process with jumps such as Levy process, optimal stopping techniques, and nonlinear filtering techniques. Large deviation theory plays a significant role in the analysis of search and detection methods with Poisson distributed sensors and also in the assessment of the impact of noise in turbulent flows. Other Air Force applications of large deviations such as risk analysis and estimation of rare event probabilities for failure analysis are also within the scope of this research program. Also of interest are approximation techniques for the nonlinear filtering equations of Fujisaki-Kallianpur-Kunita equation and the Zakai equation to derive practical algorithms extending the Kalman filtering technique and sequential Monte Carlo techniques, such as particle filtering. Research problems in hypersonic aerodynamics are of top priority. Novel methods to combine techniques from statistical and machine learning and also sparse methods and compressed sensing to stochastic analysis and control of fluid dynamics and turbulence estimation is also of interest.

References

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Sritharan SS, Sundar P: Stochastic Processes, Theory and Applications 116(11): 1636, 2006

Popa S, Sritharan SS: Communications on Stochastic Analysis 3(3): 313, 2009

Research Advisor

Prospective applicants are encouraged to contact the opportunity's Research Advisor, listed below, to discuss the applicant's approach for responding to this research opportunity and to discuss their potential collaboration on the research opportunity.

Dr. Sivaguru S. Sritharan, sivaguru.sritharan@afit.edu, (937) 255-6565 Ext.3315

Qualifications

Candidates must have a Ph.D., Sc.D., M.D., D.V.M., or academically equivalent research doctorate before beginning the fellowship.

Candidates must have U.S. citizenship. Research opportunities at AFRL, AFIT, and USAFA are open to U.S. citizens only. Qualified applicants will receive consideration without regard to race, creed, color, age, sex, or national origin.

Stipend rates are determined by Air Force officials, and are based on the applicant's academic and professional background. The fellow must show proof of health and medical insurance. Health insurance can be obtained through ORAU. The fellow will not enter into an employee/employer relationship with ORAU, USAF, or any other facility, office or agency. Instead, the participant will be affiliated with ORAU for the administration of the appointment through the ORAU appointment letter and Terms of Appointment.

For more information, please visit the Air Force STFP website at https://AirForceFellowships.orau.org.

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12)
  - **Computer, Information, and Data Sciences** (16)
  - **Earth and Geosciences** (21)
  - **Engineering** (27)
  - **Environmental and Marine Sciences** (12)
  - **Life Health and Medical Sciences** (45)
  - **Mathematics and Statistics** (10)
  - **Other Non-Science & Engineering** (2)
  - **Physics** (16)
  - **Science & Engineering-related** (1)
  - **Social and Behavioral Sciences** (18)