CENTER FOR TURBULENCE RESEARCH

Summer Research Opportunity

June 24-July 20, 2018

The Center for Turbulence Research invites applications for participation in its 17th biennial Summer Program. The objective of the Summer Program is to promote development and evaluation of new ideas in fluid mechanics with emphasis on turbulent flows. It is expected that the novel concepts and preliminary results generated during the Summer Program will be of sufficiently high caliber to lead to journal publications and to provide grounds for opening new lines of research in the participants' home institutions.

In recent years a significant number of proposals were focused on promoting applications of mature computational tools to real-world problems and extending analyses of complex flows to multi-physics systems. In contrast, this year the Summer Program seeks to host studies that will introduce novel concepts at a fundamental level while envisioning long-term applicability for engineering analysis. Accordingly, proposals focusing on high-risk new concepts, whose first-ever deployment may be limited to canonical problems during the Summer Program, and which may provide opportunities applicable to realistic scenarios, are strongly encouraged.

Examples of broad research areas of current interest at CTR are: (i) Aerodynamics, including wall-modeling for LES of high Reynolds number flows, and boundary-layer transition physics and modeling; (ii) Multi-physics problems in turbulent flows, including multi-scale dynamics in turbulent combustion, aero-acoustics, combustion noise, multi-phase flows, flow-structure interactions, hypersonics, and plasma turbulence; (iii) Subgrid-scale closures for LES of complex multi-physics flows, including chemically reacting flows, two-phase flows, radiative flows, high-pressure systems and problems involving dispersed phases such as particle-laden turbulence; (iv) Numerical analysis for multi-scale and multi-physics problems in fluid dynamics, and scalable and efficient methods for emerging computer architectures; (v) Statistical methods for analysis or modeling of chaotic systems, including uncertainty quantification, novel data-mining techniques and information extraction from large datasets; (vi) Flow control and optimization strategies for complex flows.

Computer expertise is not essential, and applications from experimentalists and theoreticians are encouraged. Applicants may request support from CTR research staff and graduate students skilled in computer programming and familiar with the Center's computational infrastructure. Faculty applicants may also propose to have one advanced doctoral student accompany them. Several large-memory multi-processor Linux systems, computer clusters with over 10,000 cores, GPU's, FPGAs, an IBM Power system with 2TB main memory, an Intel Xeon Phi computer cluster, numerous graphics workstations and a visualization system with a large 9-tile display for 3-D data analysis will be available to the participants.

Participants will be selected on the basis of their proposals, the overall synergistic potential of the group and multi-institutional collaborations, and on the utilization of CTR's intellectual resources and infrastructure. Applicants are encouraged to identify faculty and research staff at CTR as potential collaborators. Fellowships will provide appropriate support, including travel and a stipend. **For more information regarding the format and previous research performed at CTR Summer Programs visit: http://ctr.stanford.edu.**

Application Procedure:

Applicants should submit a brief proposal stating the fundamental questions to be addressed, current state of the art, technical approach, a list of the on site personnel that will be involved in the project, goals for the summer research at CTR, the data and the computer codes to be employed, along with financial requirements and current curriculum vitae. Applications must be received by January 15, 2018. Awards will be announced on February 28, 2018 Housing arrangements will be made thereafter.

Submit applications in pdf format to: turbulence@stanford.edu

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