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Professor Y. M. Gupta
ISP/Applied Sciences Laboratory
Washington State University
100 Dairy Road, Room 202
Pullman, WA 99164-1120

Dr. Gupta:

I just came across your advertised position for Computational Research Scientist at the Applied Sciences Laboratory. The provided description of ASL was very intriguing as it aligned closely with my ideal combination of private industry and academia. Admittedly, I don't meet the experience criteria you are looking for (3 years of postdoctoral research and grant history), but perhaps there is a postdoc or similar position that I could begin with before transitioning into a more permanent role. Your research environment sounds very similar to what I experienced through four summers at Lawrence Livermore National Laboratory where I worked on developing modern compressible flow solvers for simulating materials under extreme conditions. I should be completing my Ph.D. at the Institute for Computational Engineering and Science at the University of Texas next summer. ICES is an interdisciplinary research unit that teaches the mathematics, physical modeling, and computational know-how behind scientific computing. As such, I have a strong background in computational mechanics as a whole with a special emphasis on computational fluid dynamics. My Ph.D. experience has rounded out my knowledge of the mathematics behind numerical algorithms and the various techniques needed to develop stable methods for various types of physical phenomena. While I do not currently have grant writing experience, I believe this is something I could grow to excel at given some mentorship. It is important to me that my research brings ultimate benefit to society, and I pride myself on being able to communicate that benefit clearly and persuasively.

My current research has been focused on developing the discontinuous Petrov-Galerkin (DPG) finite element method for fluid dynamics applications. DPG offers a fundamental framework for developing robust residual-minimizing finite element methods, even for equations that usually cause problems for standard techniques, such as convection-dominated diffusion and Stokes flow. The strength of the technique lies in the straightforward application to any well-posed PDE due to DPG's superior stability properties. I recently published a paper on my work developing a locally conservative DPG formulation and submitted a paper detailing a space-time formulation for transient problems. Given complete freedom, I would pursue the extension of my current work to magnetohydrodynamics and multiphase flows but I am amenable to other pursuits if funding favors other directions. I have had some excellent opportunities for collaborations both at LLNL and ICES. Should you wish to speak with my advisors, at LLNL they were Tzanio Kolev (kolev1@llnl.gov, 925-423-9797) and Rob Rieben (rieben1@llnl.gov, 925-422-3783). My current advisor is Leszek Demkowicz (leszek@ices.utexas.edu, 512-471-4199).

While I am pursuing various other postdoctoral positions and industry jobs, the environment and location of ASL appeal more than most of the alternatives. I am in candidacy and working on research full time at the moment, so my schedule is fairly open should you wish to chat. The prospect of working at the Applied Sciences Laboratory is very exciting to me and I would welcome a chance to discuss a possible role there. Thank you for your time and consideration.

Sincerely,

Truman E. Ellis

encl: Curriculum Vitae