Chaitanya D. Ghodke

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Professional Experience

Convergent Science Inc. — Madison, WI

Research Engineer — *Apr '17 - present*
– Computational modeling of internal combustion engines. Developing and supporting technology solutions for clients in automobile domain.

General Electric, Global Research Center — Niskayuna, NY

Research Engineer — *Apr '16 - Feb '17*
– As a part of Thermal Systems Organization, work was focused on designing cooling methodologies for gas turbine engines, performing high-fidelity **L**arge-**E**ddy **S**imulations of turbine internal cooling passages to study turbine blade heat transfer. Designing advanced cooling technologies for various GE business units.

Computational Flow Physics Lab, Oregon State University — Corvallis, OR

Graduate Research Assistant — *Jan '13 - Mar '16*
– Funded by National Science Foundation (NSF), work was primarily focused on performing **D**irect **N**umerical **S**imulations of oscillatory turbulent boundary layer over a bed of particles, representative of sediment bed in coastal environment. Investigate the effects of sediment-bed on near-wall turbulence and study spatio-temporal characteristics of unsteady forces on sediment grains to influence existing stochastic sediment erosion models.

CD-Adapco — Detroit, MI

CFD Application Engineer — *Aug '11 - Dec '12*
– Job involved performing computational simulations to efficiently optimize design of a diverse range of industrial problems including combustion, heat transfer, external aerodynamics, biomedical applications.

Computational Combustion Lab, Georgia Institute of Technology — Atlanta, GA

Graduate Research Assistant — *Jan '09 - Jul '11*
– Funded by Air Force Office of Scientific Research (AFOSR), work was focused on performing **L**arge **E**ddy **S**imulation of supersonic combustion for SCRAMJET using advanced turbulent combustion models.

General Motors Technical Centre — Bangalore, India

Computational Aerodynamics Analyst — *Jul '07 - Jul '08*
– Computational aerodynamic analysis of automotive vehicles for drag prediction and optimization, designing advanced technologies for the improvement in fuel economy, aero-acoustics analysis for passenger comfort.

Intern Experience

General Electric, Global Research Center — Niskayuna, NY

Intern - Heat Transfer Methods Lab — *July '15 - Sept'15*
– As a part of computing challenge award by U.S. Department of Energy (DOE), performed **L**arge-**E**ddy **S**imulations of turbine blades cooling passages to study effects of blade rotation on heat transfer augmentation.

Center for Turbulence Research, Stanford University — Stanford, CA

Visiting Scholar for Summer Program 2014 — *July '14 - Aug '14*
– Research work involved performing **D**irect **N**umerical **S**imulations to characterize the onset of sediment incipient motion under oscillatory flow conditions representative of coastal environment.

FLUENT India Pvt. Ltd. — Pune, India

Intern - Marine applications — *Oct '06 - Apr '07*
– Development of a realistic water wave boundary condition in the towing tank to study marine applications.

Thermax Ltd. — Pune, India

Intern - Heat Transfer, Process Heat Division — *May '04 - May '05*
– Computational heat transfer analysis of hot flue gas path in thermic fluid heaters used in power plants.

Education

- **Oregon State University, Corvallis**   Jan '13 - Mar '16
  PhD, Department of Mechanical Engineering   *4.0/4.0*
  Thesis: DNS of particle-bed–turbulence interactions in oscillatory flows.

- **Georgia Institute of Technology, Atlanta**   Jan '09 - Jul '11
  Master of Science, Department of Aerospace Engineering   *3.64/4.0*
  Thesis: Large-Eddy Simulation of supersonic turbulent combustion in a cavity-strut flameholder.

- **Moscow State University in association with IIIT, India**   Sep '05 - Jul'07
  Master of Science with specialization in CFD   *3.7/4.0*
  Thesis: Validation study of incoming wave boundary conditions in the towing tank model using VoF.

- **University of Pune, India**   Jul '01 - Jul '05
  Bachelor of Engineering, Department of Mechanical Engineering   *First Class*
  Thesis: Computational heat transfer analysis of hot flue gas path in thermic fluid heaters.

Awards and Academic Honors

- **ASME graduate student *returning* scholarship for outstanding paper**
  Fluids Engineering Division Summer Meeting 2016, Washington DC, USA
  Awarded by American Society of Mechanical Engineers (ASME) as a returning scholarship for continuing outstanding work in the field of fluid dynamics.

- **NASA Jet Propulsion Lab (JPL) Graduate Fellowship, 2015**
  Climate Physics group., Pasadena, USA
  Awarded JPL fellowship to conduct research in the field of climate science. *Did not participate due to personal reasons.*

- **Outstanding Gratuate Research Assistant of the year 2014-15**
  Department of Mechanical Engineering, Oregon State University, USA
  Annual excellence award to recognize an outstanding graduate research assistant in Mechanical Engineering.

- **Oregon Lottery Graduate Scholarship, 2015**
  Oregon State University, USA
  Awarded by Graduate School to meritorious student on the basis of academic merit.

- **ASME graduate student scholarship for outstanding paper**
  Fluids Engineering Division Summer Meeting 2014, Chicago, USA
  Prestigious recognition awarded by ASME for outstanding technical paper in the field of fluid dynamics.

- **Summer program scholarship at Center for Turbulence Research (CTR)**
  Stanford University, USA
  Selection to participate in the 15th biennial Summer Program of the CTR, sponsored by the US Air Force, NSF, NASA, and DOE. Total 75 participants from 9 countries were selected based on their research proposal.

- **Rickert fellowship and Mechanical Engineering scholarship, 2013-14**
  Department of Mechanical Engineering, Oregon State University, USA
  Competitive scholarship awarded to recognize outstanding graduate students in college of engineering.

- **First rank in Master of Science program, 2007.**
  Moscow State University, Russia and IIIT, India
  Secured overall first rank in Master of Science program

- **First prize for technical paper, Society of Automotive Engineers (SAE) India Annual Social, 2004**
  Automotive Research Association Of India (ARAI), India.
  Awarded first prize to the technical paper "CFD of insect flight" in an international symposium held by SAE.

- **First prize in SAE technical paper presentation competition (collegiate chapter), 2004**
  University of Pune, India

Other Scholarships

- Scholarship to attend **"The Burgers Program Summer Research School on Fluid Dynamics: Topics in Turbulence"**, University of Maryland, June 2015.

- Scholarship to attend **"Combustion Summer School"**, Princeton University, June 2015.

- **American Physical Society (APS) scholarship** to attend Energy Research Meeting, March 2014.

Publications - Archival Journals

- **Ghodke, C.**, and Apte, S.,**"DNS study of particle-bed–turbulence interactions in an oscillatory wall-bounded flow"**, *Journal of Fluid Mechanics, Vol. 792, 2016.* doi:10.1017/jfm.2016.85

- **Ghodke, C.**, and Apte, S.,**"Spatio–temporal analysis of hydrodynamic forces on the particle-bed in an oscillatory flow environment"**, in revision, *Journal of Fluid Mechanics*

- **Ghodke, C.**, and Apte, S.,**"The effects of roughness on second-order turbulence statistics in oscillatory flows"**, in revision, *Computer & Fluids*

- **Ghodke, C.**, Skitka, J., and Apte, S.,**"Characterization of oscillatory boundary layer over a closely packed bed of sediment particles"**, *Special Issue (invited) on Journal of Computational Multiphase Flows, Vol. 6, No. 4, November, 2014.* doi: 10.1260/1757-482X.6.4.447

- **Ghodke, C.**, Apte, S., and Urzay, J.,**"Direct numerical simulations of oscillatory wall-bounded flow over a closely-packed fixed bed of spherical particles"**, *Center for Turbulence Research, Proceedings of the Summer Program 2014*

- Grady, N.R., Pitz, R.W., Carter, C.D., **Ghodke, C.D.**, Menon, S., **"Hydroxyl Tagging Velocimetry in a supersonic flow over a ramped-wall cavity flameholder with an upstream strut"**, *Journal of Propulsion and Power, Vol. 28, No. 5, September - October, 2012*

Publications - Refereed Conference Proceedings

- **Ghodke, C.**, and Apte, S.," **A numerical investigation to study roughness effects in oscillatory flows"**, to be appeared in *Proceedings of the ASME Fluids Engineering Summer Meeting 2017, Hawaii, USA.*

- **Ghodke, C.**, and Apte, S.,**"Particle-resolved DNS to study spatio-temporal correlations of hydrodynamic forces on particle-bed in an oscillatory flow environment"**, *Proceedings of the ASME Fluids Engineering Summer Meeting 2016, Washington DC, USA.*

- **Ghodke, C.**, and Apte, S.,**"A numerical investigation of particle-bed–turbulence interactions in oscillatory flows"**, *Proceedings of 9th International Conference on Multiphase Flow 2016, Firenze, Italy.*

- Apte, S., Dogan, O., and **Ghodke, C.,"Numerical investigation of potential erosion mechanism in turbulent flow of** SCO_2 **pipe bends"**, *Proceedings of 5th International Symposium on Supercritical CO_2 Power Cycles 2016, Texas, USA.*

- **Ghodke, C.**, and Apte, S.,**"Spatio-temporal correlations of hydrodynamic forces on particles in an oscillatory wall-bounded flow environment"**, *Proceedings of the ASME-JSME-KSME Joint Fluids Engineering Summer Meeting 2015, Seoul, Korea.*

- **Ghodke, C.**, and Apte, S.,**"DNS of oscillatory boundary layer over a closely packed layer of sediment particles"**, *Proceedings of the ASME Fluids Engineering Summer Meeting 2014, Chicago, USA.*

- **Ghodke, C.**, Pranatharthikaran, J., Retaureau, R., Menon, S., **"Numerical and experimental studies of flame stability in a cavity stabilized hydrocarbon-fueled scramjet"**, *17th AIAA International Space Planes and Hypersonic Systems and Technologies Conference, Apr 2011, California, USA.*

- **Ghodke, C.**, Choi, J., Srinivasan, S., Menon, S., "**Large eddy simulation of supersonic combustion in a cavity-strut flameholder**", *AIAA-2011-323, 49th AIAA Aerospace Sciences Meeting, Jan 2011, Florida, USA.*

- Choi, J., **Ghodke, C.**, Menon, S., "**Large eddy simulation of cavity flame-holding in a Mach 2.5 cross flow**", *AIAA-2010-414, 48th AIAA Aerospace Sciences Meeting, Jan 2010, Florida, USA.*

Presentations Invited/Contributed

- Apte, S., and **Ghodke, C.**,"**Particle-resolved direct numerical simulation of particle-bed–turbulence interactions in oscillatory flows**", *AGU Fall Meeting, Dec 2016, San Francisco, CA.*

- **Ghodke, C.**, Ledezma, G., Slepski, J., Apte, S., and Laskowski, G.,"**LES of turbine internal cooling passages**", *ASME Fluids Engineering Summer Meeting 2016, Washington DC, MA.*

- **Ghodke, C.**, Apte, S., and Urzay, J.,"**DNS study of particle-bed–turbulence interactions in an oscillatory wall-bounded flow**", *68th Annual Meeting of APS-DFD, Nov 2015, Boston, MA.*

- **Ghodke, C.** "**Particle-turbulence interactions in an oscillatory wall-bounded flow**", *Applied Mathematics and Computation Seminar (invited), Oregon State University, May 2015.*

- **Ghodke, C.**, Apte, S., and Urzay, J.,"**Particle-resolved DNS of turbulent oscillatory flow over a layer of fixed particles**", *67th Annual Meeting of APS-DFD, Nov 2014, San Francisco, USA.*

- **Ghodke, C.**, Skitka, J., and Apte, S.,"**DNS of oscillatory boundary layer over a closely packed layer of sediment particles**", *66th Annual Meeting of APS-DFD, Nov 2013, Pittsburgh, USA.*

Professional Service Activities

- **Symposium Co-organizer** for Symposium on DNS/LES & Hybrid RANS/LES Methods in the upcoming ASME Fluids Engineering Summer Meeting, Hawaii, 2017

- **Session Chair** for Symposium on DNS/LES & Hybrid RANS/LES Methods in the upcoming ASME Fluids Engineering Summer Meeting, Hawaii, 2017

- **Session Chair** for Symposium on DNS/LES & Hybrid RANS/LES Methods in ASME Fluids Engineering Summer Meeting, Washington DC, 2016

- Selected to be a member of **ASME Computational Fluid Dynamics (CFD) Technical Committee**. Responsible for planning and organizing ASME's CFD related activities.

- Member of **Sigma Xi**, The Scientific Research Society

- Review manuscripts for high impact journals such as **Journal of Fluid Mechanics** (Cambridge University Press), **Journal of Computational Physics** (Elsevier publishing), **Flow Turbulence and Combustion** (Springer publishing), **Computers & Fluids** (Elsevier publishing), **Journal of Hydraulic Engineering** (American Society of Civil Engineers), **Journal of Fluid Dynamics Research** (IOP publishing), **Journal of Propulsion and Power** (American Institute of Aeronautics and Astronautics), **ASME proceedings** along with **Journal of Mechanics Engineering & Automation**

Teaching Experience

- **ME 567, Engineering Applications of Computational Fluid Dynamics**, Department of Mechanical Engineering, Oregon State University, Graduate Teaching Assistant for Prof. Deborah Pence, (Jan '16 - Apr '16)

- **ME 331, Introductory Fluid Mechanics**, Department of Mechanical Engineering, Oregon State University, Graduate Teaching Assistant for Prof. James Liburdy, (Apr '15 - Jun '15)

- **ME 567, Engineering Applications of Computational Fluid Dynamics**, Department of Mechanical Engineering, Oregon State University, Graduate Teaching Assistant for Prof. Deborah Pence, (Jan '15 - Apr '15)

- **ME 311, Introduction to Thermal-Fluid Sciences**, Department of Mechanical Engineering, Oregon State University, Graduate Teaching Assistant for Prof. Sourabh Apte, (Jun '13 - Sept '13)

- **ME 373, Mechanical Engineering Methods**, Department of Mechanical Engineering, Oregon State University, Graduate Teaching Assistant for Prof. Nancy Squires, (Jan '13 - Apr '13)

- While working at CD-adapco, conducted various **professional training sessions of STAR-CCM+** for industrial clients, university professors and students

Technical Skills

Languages: Fortran, MPI/OPENMP

HPC Machines: Experience of working on high performance computing systems of TACC, ANL, AFRL and Navy.

Packages: STAR-CCM+, STAR-CD, FLUENT, ICEM-CFD, ANSA, T-Grid, Matlab, CHEMKIN, FieldView, TecPlot