NGUYEN Duy Thien

CONTACT INFORMATION

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RESEARCH INTERESTS

Experimental fluid dynamics, optical measurement techniques (stereo Research particle image velocimetry (PIV), planar laser induced fluorescent (PLIF)) for quantitative measurement in turbulent flows, single and multiphase flows.
Turbulent flows in rotating systems: rotor-stator, rotating cylinder; turbulent flows in circular jets, plane jets, wall jets, impinging jets; and turbulent flows in open water channels.
Numerical simulations of turbulent flows, open channel flows and multiphase flows using VOF method.
Proper orthogonal decomposition (POD) analysis, dynamical modelling, measurement modelling.
BioMEMS: single color and multicolour total internal reflection (TIR)-based chips for highly-sensitive fluorescent sensing and imaging.
Thermal-hydraulics effects in nuclear engineering applications (currently, the Reactor Cavity Cooling System) involved to laminar, turbulent and buoyancy-driven flows.

EDUCATION

Bachelor of Aeronautical Engineering, Program of Excellence Engineer between Vietnam and France (PFIEV), HoChiMinh City University of Technology, Vietnam National University, September 2004.

Master of Civil and Environmental Engineering, Fluid Dynamics Laboratory, Ritsumeikan University, Japan, September 2007.

Doctor of Civil and Environmental Engineering, Fluid Dynamics Laboratory, Ritsumeikan University, Japan, October 2010.

WORKING EXPERIENCE

Research Assistant Professor, Thermal-Hydraulic Research Laboratory, Texas A&M University, College Station, Texas, USA, 2015-present.
Postdoctoral fellow, NERS Department, University of Michigan, Ann Arbor, USA, 2014-2015.

- Doing PIV, stereo-PIV and PLIF experiments, and performing numerical simulations on the configurations: horizontal circular jets, vertical plane jets.
- Scaling analysis of the Reactor Cooling Cavity System, and designing the laboratory-scale, separate-effects experimental system for the hot plenum.

Postdoctoral researcher, TEMPO laboratory, University of Valenciennes and Hainaut-Cambresis, University of Lille North of France, 2011-2014.

- Doing stereo-PIV experiments and performing numerical simulations on configurations: turbulent jet impinging on an open rotor-stator configuration; turbulent

cross-flow over a rotating circular cylinder attached with a spanwise disk; turbulent wall jet over a backward-facing step.

- Performing POD analysis, dynamical and experiment modelling, data assimilation.

Research associate, Mechanical, Materials and Aerospace Engineering Department, Illinois Institute of Technology, USA, 2009-2010.

- Performing POD analysis, dynamical and experiment modelling, data assimilation on turbulent flows over a backward-facing step.

Research assistant, Civil and Environmental Engineering Department, Ritsumeikan University, Japan, 2005-2010.

- Doing stereo-PIV experiments in open water channel and developing PIV-based measurement techniques.
- Performing PIV measurements to experimental images from Versatile Microfluidic Total Internal Reflection (TIR)-based devices.
- Performing multiphase open channel flow simulation using volume-of-fluid (VOF) in ANSYS-FLUENT.

Lecturer, Aeronautical Engineering Department, HoChiMinh City University of Technology, Vietnam National University, Vietnam, 2004-2005.

- Assisting and teaching the undergraduate courses of fluid mechanics, aerodynamics, turbo-machinery, and supervising student experiments with wind tunnel.

Technical Skills

Numerical simulations of turbulent flows using ANSYS-FLUENT, STAR-CCM+.
Image processing, data and signal analysing with Matlab.
Programming in C, C++, LabView; high speed camera control and synchronization.
Extensive knowledge of computer hardware and software (Windows, Linux, Macintosh, AutoCad, PTC Creo, LaTeX, Offices).

Awards

Monthly scholarship for best grade students (1999-2004) by the Vietnamese Ministry of Education.
The first prize for Vietnam National Student Research (2004-2005) by the Vietnamese Ministry of Education.
The first prize for Vietnam National Technology Creation (VIFOTEC 2004-2005) by the Vietnam Fund of Technology Creation.
The Odon Vallet scholarship for best students (2005) by Odon Vallet.
Japanese Government Scholarship for Master student (2005-2007).
Japanese Government Scholarship for Doctoral student (2007-2010).
Research Fund for Accelerating International Research Activities (2009) by Ritsumeikan University.

Professional, Social Activities

Reviewer for Measurement Science and Technology, Institute of Physics Publishing (IOP).
Reviewer for Flow Measurement and Instrumentation, Elsevier.
Reviewer for ASME Heat Transfer, ASME.
Reviewer for International Journal of Heat and Mass Transfer, Elsevier.
Member of Vietnamese Youth and Student Association in Japan.

Member of Japan Society of Civil Engineers.
Member of American Physical Society.
Soccer team leader in high school, undergraduate and graduate school.
Participating social activities in aiding Vietnamese people.

Publications

Dissertation

- **Thien Duy Nguyen**, Development of Stereo Particle Image Velocimetry: Application to turbulent flow over a backward-facing step, *Master dissertation*, Ritsumeikan University, September, 2007.
- **Thien Duy Nguyen**, Proper Orthogonal Decomposition (POD) based measurement models for engineering flows, *Doctoral dissertation*, Ritsumeikan University, 2010.

Journal papers

1. **T. D. Nguyen**, N. Goth, M. Childs, P. Jones, S. Lee, R. Vaghetto, Y. A. Hassan, PIV measurements of turbulent flows in a 61-pin wire-wrapped hexagonal fuel bundle, *International Journal of Heat and Fluid Flow*, 2017. (Under Revision)

2. **T. D. Nguyen**, S. Harmand, PIV measurements in a turbulent wall jet over a backward-facing step in a three-dimensional, non-confined channel, *Flow Measurement and Instrumentation*, 42, 2015, pp. 26-39.

3. S. Poncet, **T.D. Nguyen**, J. Pellé, S. Harmand, R. Da Soghe, C. Bianchini, S. Viazzo, Turbulent impinging jet flow into an unshrouded rotor-stator system: hydrodynamics and heat transfer, *International Journal of Heat and Fluid Flow*, 44, 2013, p.719-734.

4. **T. D. Nguyen**, S. Harmand, Heat transfer and vortical structures around a rotating cylinder with a spanwise disk and low-velocity crossflow, *International Journal of Heat and Mass Transfer*, 64, 2013, pp. 1014-1030.

5. N. C. H. Le, R. Yokokawa, D. V. Dao, **T. D. Nguyen**, J. C. Wells and S. Sugiyama, Highly-sensitive fluorescence detection and imaging with microfabricated total internal reflection (TIR)-based devices, *Journal of Micro-Nano Mechatronics*, 7(1-3), 2012, pp. 45-59. (invited article)

6. **T. D. Nguyen**, J. Pellé, S. Harmand, S. Poncet, PIV measurements of an air jet impinging on an open rotor-stator system, *Experiments in Fluids*, 53, 2012, pp. 401-412.

7. **T. D. Nguyen**, J. C. Wells, C. V. Nguyen, Velocity measurement of near-wall flow over inclined and curved boundaries by extended interfacial particle image velocimetry, *Flow Measurement and Instrumentation*, 23(1), 2012.

8. **T. D. Nguyen**, J. C. Wells, P. Mokhasi, D. Rempfer, Proper orthogonal decomposition (POD) based estimations of the flowfield from particle image velocimetry (PIV) wall gradient measurements in the backward-facing step flow, *Measurement Science and Technology*, 21(11), 2010, pp. 1-15.

9. **T. D. Nguyen**, J. C. Wells, C. V. Nguyen, Wall shear stress measurement of near-wall flow over inclined and curved boundaries by stereo interfacial particle image, *International Journal of Heat and Fluid Flow*, 31, 2010, pp. 442-449. (invited article)

10. Nguyen, C., **Nguyen, T. D.**, Wells, J., Nakayama, A., Interfacial PIV to resolve flows in the vicinity of curved surfaces, *Experiments in Fluids*, 48(4), 2010. (invited article)

11. N. C. H. Le, R. Yokokawa, D. V. Dao, **T. D. Nguyen**, J. C. Wells and S. Sugiyama, Versatile Microfluidic Total Internal Reflection (TIR)-based Devices: Application to Microbeads Velocity Measurement and Single Molecule Detection with Upright and Inverted Microscope, *Lab on a Chip*, 9 (2009), pp. 244-250.

12. C. V. Nguyen, **T. D. Nguyen**, J. C. Wells, Sensitivity of PIV/ Interface Gradiometry to Estimated Wall Position, *Journal of the Visualization Society of Japan*, 26(2), pp. 203-206, 2006.

Conference, symposium presentations

1. **T. D. Nguyen**, M. Childs, M. Marciniak, Y. A. Hassan, High Resolution Stereoscopic PIV Measurements In a 5x5 Rod Bundle with Mixing Vane, *American Nuclear Society 2017 Annual Meeting*, 2017. (to be presented)

2. N. Goth, M. Childs, P. Jones, S. Lee, **T. D. Nguyen**, R. Vaghetto, Y. A. Hassan, Time-Resolved PIV/PTV Measurements on Interior Subchannels of a Wire-Wrapped 61-pin Hexagonal Fuel Bundle, *American Nuclear Society 2017 Annual Meeting*, 2017. (to be presented)

3. N. Goth, M. Childs, P. Jones, S. Lee, **T. D. Nguyen**, R. Vaghetto, Y. A. Hassan, Particle Image Velocimetry Measurements in a Wire-Wrapped 61-Pin Hexagonal Fuel Bundle, *American Nuclear Society 2016 Winter Meeting and Technology Expo*, Nevada, 2016. (refereed)

4. N. Goth, M. Childs, P. Jones, S. Lee, **T. D. Nguyen**, R. Vaghetto, Y. A. Hassan, Pressure Measurements in a Wire-Wrapped 61-Pin Hexagonal Fuel Bundle, *American Nuclear Society 2016 Winter Meeting and Technology Expo*, Nevada, 2016. (refereed)

5. S. R. Yang, M. Silberberg, C. Fullerton, **T. D. Nguyen**, R. Vaghetto, Y. Hassan, Experimental study on a simplified facility of HTGR reactor building response to depressurization accidental scenarios, *Int. Topical Meeting on High Temperature Reactor Technology (HTR2016), ANS Winter Meeting*, Nevada, 2016. (refereed)

6. N. Goth, M. Childs, P. Jones, S. Lee, **T. D. Nguyen**, R. Vaghetto, Y.A. Hassan, Velocity and pressure measurements in a wire-wrapped 61-pin hexagonal fuel bundle, *The 11th International ERCOFTAC Symposium on Engineering Turbulence Modelling and Measurements*, Italy, 2016. (refereed)

7. **T. D. Nguyen**, V. Petrov, A. Manera, A separate-effect test facility for CFD-grade measurements of the RCCS upper plenum, *International Topical Meeting on Nuclear Reactor Thermal Hydraulics - NURETH-16*, Chicago, 2015. (refereed)

8. V. Petrov, **T. D. Nguyen**, A. Manera, D. Nunez, High resolution experiments of velocity and concentration fluctuations in a jet flow, *International Topical Meeting on Nuclear Reactor Thermal Hydraulics - NURETH-16*, Chicago, 2015. (refereed)

9. **T. D. Nguyen**, V. Petrov, A. Manera, Design of a scaled experimental facility for the NGNP Reactor Cavity Cooling System, *American Nuclear Society 2014 Winter Meeting and Technology Expo*, Anaheim, California, 2014. (refereed)

10. **T. D. Nguyen**, S. Harmand, Heat and mass transfers from a rotating cylinder with a spanwise disk at low-velocity crossflows, *Proceedings of ASME 2013 Fluids Engineering Division Summer Meeting FEDSM2013*, Nevada, USA, 2013. **(refereed)**

11. **T. D. Nguyen**, B. Latour, S. Harmand, Flowfield around a rotating cylinder with a spanwise disk in air crossflow, *The 9th EuroMech Fluid Mechanics Conference (EFMC9)*, Rome, Italy, 2012. **(refereed)**

12. J. Pellé, **T. D. Nguyen**, S. Harmand, Mass and heat transfer inside the air gap of a discoidal and unshrouded rotor-stator system with a jet impingement, *Proceedings of ASME 2012 Summer Heat Transfer Conference HT2012*, Rio Grande, Puerto Rico, 2012. **(refereed)**

13. **T. D. Nguyen**, J. Pellé, S. Harmand, S. Poncet, PIV measurements of an air jet impinging on an open rotor-stator system at low gap spacing, *The 64th Annual Meeting of the American Physical Society's Division of Fluid Dynamics*, Baltimore, Maryland, USA, November 20-22, 2011. **(refereed)**

14. **T. D. Nguyen**, T. X. Dinh, J. C. Wells, P. Mokhasi, D. Rempfer, POD-based estimations of the flowfield from free-surface velocity in the backward-facing step flow, *Proc. of The Seventh Int. Symp. on Turbulence and Shear Flow Phenomena (TSFP7)*, Ottawa, Canada, July, 2011. **(refereed)**

15. **T. D. Nguyen**, T. M. N. Phan, J. C. Wells, P. Mokhasi, D. Rempfer, Prediction of the flowfield from free-surface measurements by POD-based estimation techniques, *Proc. of the 8th Int. Symp. on Ecohydraulics*, COEX, Seoul, Korea, September 12-16, 2010. **(refereed)**

16. **T. D. Nguyen**, J. C. Wells, P. Mokhasi, D. Rempfer, POD-based estimations of the flowfield from wall gradient measurements in the backward-facing step flow, *Proc. of the 3rd US-European Fluids Engineering Summer Meeting and the 8th International Conference on Nanochannels, Microchannels, Minichannels*, Montreal, Canada, August 1-5, 2010. **(refereed)**

17. **T. D. Nguyen**, J. C. Wells, Near-wall measurement by stereo interfacial particle image velocimetry, *Proc. of the 14th Int. Symp. of Flow Visualization ISFV14*, EXCO, Daegu, Korea, June 21-24, 2010. **(refereed)**

18. **T. D. Nguyen**, J. C. Wells, C. V. Nguyen, Wall Shear Measurement Of Near-wall Flows Over Inclined and Curved Boundaries by Stereo-Interfacial PIV, *The 62nd Annual Meeting of the American Physical Society's Division of Fluid Dynamics*, Minneapolis, USA, November 22-24, 2009.

19. **T. D. Nguyen**, J. C. Wells, C. V. Nguyen, Wall Shear Stress Measurement of Near-Wall Flow over Inclined and Curved Boundaries, *Proc. of The Sixth Int. Symp. on Turbulence and Shear Flow Phenomena (TSFP6)*, Seoul, Korea, June 22-24, 2009. **(refereed)**

20. C. V. Nguyen, **T. D. Nguyen**, J. C. Wells, A. Nakayama, Interfacial PIV: Velocity Interpolation Near Curved Wall, *Proc. of the 13th Int. Symp. of Flow Visualization ISFV13, The 12th French Congress on Visualization in Fluid Mechanics FLUVISU12*, Nice, France, July 1-4, 2008. **(refereed)**

21. C. V. Nguyen, **T. D. Nguyen**, J. C. Wells, A. Nakayama, Proposals for PIV of Near-Wall Flow over Curved Boundaries, *Proc. of 14th Int. Symp. on Applications of Laser Techniques to Fluid Mechanics*, Lisbon, Portugal, 07-10 July, 2008. **(refereed)**

22. N. C. H. Le, R. Yokokawa, D. V. Dao, **T. D. Nguyen**, J. C. Wells, S. Sugiyama, Integration of Evanescent Excitation (EE)-based Chip with Microfluidic Channels for Upright and Inverted Microscope Observations, *Proc. of 12th Int. Conf. on Miniaturized Systems for Chemistry and Life Sciences* (MicroTAS 2008), pp. 1603-1605, San Diego, CA, USA, Oct. 12-16, 2008. **(refereed)**

23. R. Yokokawa, N. C. H. Le, **T. D. Nguyen**, D. V. Dao, J. C. Wells, S. Sugiyama, Development and Application of Total Internal Reflection (TIR)-based Chip Based on MEMS Technology, *Proc. of the 2008 Int. Symp. on Micro/Nano Systems Technology* (2008 ISMST), pp. 149-154 , Hanoi, Vietnam, Dec. 18-21, 2008.

24. N. C. H. Le, R. Yokokawa, D. V. Dao, **T. D. Nguyen**, J. C. Wells, S. Sugiyama, Measurement Near-wall Velocity Fields of Fluorescent Nanoparticles Transported in Microchannel Utilizing Integrated Evanescent Excitation (EE)-based Chip, *Book of abstract of 17th Society for Chemistry and Micro Nano Systems* (CHEMINAS 17th), pp. 75, Kyushu, Japan, May. 20-21, 2008. **(refereed)**

25. **T. D. Nguyen**, J. C. Wells, C. V. Nguyen, Investigating the Sensitivity of PIV Interface Gradiometry to Estimated Wall and Boundary Detection in Experimental Images, *Proc. of The 2nd Int. Symp. on Advanced Fluid/Solid Science and Technology in Experimental Mechanics 2nd ISEM Osaka*, 2007. **(refereed)**

26. N. C. H. Le, R. Yokokawa, D. V. Dao, **T. D. Nguyen**, J. C. Wells, S. Sugiyama, Application of an Integrated Microfluidic Total Internal Reflection (TIR)-based Chip to Nano-Particle Image Velocimetry (nano-PIV), *Technical Digest of 6th IEEE Intl Conference on Sensors* (IEEE SENSORS 2007), pp. 454-457, Atlanta, Georgia, USA, Oct. 28-31, 2007.