

Ivaylo Petrov Nedyalkov

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EDUCATION	<i>Ph.D., Mechanical Engineering (Fluid Mechanics)</i> GPA 3.82 / 4 University of New Hampshire (UNH)	2008 – 2015
	<i>M.Sc., Applied Mechanics (Fluids Track)</i> GPA 4.13 / 5 Chalmers University of Technology, Sweden	2007 – 2013
	<i>B.S., Industrial Engineering</i> GPA 5.78 / 6 Technical University of Sofia, Bulgaria	2003 – 2007
ADDITIONAL EDUCATION	<i>Ph.D. course in Experimental Fluid Dynamics and Data Interpretation</i> Technical University of Denmark	2009
	<i>B.S. Physics program – audited all freshman and sophomore year classes</i> University of Sofia, Bulgaria	2005 – 2007
TRAINING AT UNH	<i>Open Educational Resources Ambassador</i> <i>Workshops on College Teaching</i> <ul style="list-style-type: none">• <i>Developing and Implementing a Student Learning -Assessment Process for your Major</i>• <i>The Learning Styles Hypothesis: Does Aligning Instructional Methods with Students Preferred Learning Styles Lead to Better Learning?</i>• <i>Incorporating Attention to Documentation/Citation in Writing Assignments</i>• <i>Active Learning in a Technology Enhanced Active Learning (TEAL) Classroom</i>• <i>Leave Your Commercial Textbook Behind and Learn To Teach with Open Educational Resources</i>• <i>Large Enrollment Courses: Energizing Student Learning through ACTION</i>• <i>Introduction to Experiential Learning</i>• <i>The Multi-Lingual Student in the University Classroom: Focus on Culture</i>• <i>The Multi-Lingual Student in the University Classroom: Faculty and Student Perspectives</i>• <i>Multi-Lingual Students in the University Classroom: Part III Teaching Strategies</i> <i>Workshops on College Teaching</i> <ul style="list-style-type: none">• <i>Incorporating Experiential Learning in the Classroom</i>• <i>Creating Desirable Difficulties during Learning</i>• <i>Managing Collaborative Writing Assignments</i>• <i>Peer-led Team Learning: A Peer-Peer Teaching Model for Higher Education</i>• <i>Methods of Engaging and Assessing Students in Large Enrollment Courses</i> <i>Zoom Room Orientation</i> <i>Labview Workshop</i> <i>Software Carpentry Workshop</i> <i>Preparing Future Faculty Workshops</i> <i>Preparing Future Professionals Workshops</i> <i>Identifying Students at Risk</i> <i>UNH Citizens Police Academy (11-week course)</i>	2018 2016/2017 2015/2016 2017 2016 2015 2008 – 2015 2008 – 2015 2015 2015

Forklift Training 2014
Responsible Conduct of Research and Scholarly Activity Training 2013
Laser Safety Training annual since 2010

**TEACHING
EXPERIENCE**

Lecturer/Teaching Assistant

University of New Hampshire

Overall Performance Average (OPA) maximum possible score is 5.

LECTURER

- 2018 SPRING – ME 503 Thermodynamics
- 2018 SPRING – ME 646 Junior Lab
- 2018 WINTER – ME 709/809 Computational Fluid Dynamics
9 students (OPA – 5.00)
- 2017 FALL – ME 705 Thermal Systems (OPA – 4.39)
- 2017 FALL – ME 503 Thermodynamics (OPA – 4.36)
- 2017 SUMMER – ME 503 Thermodynamics (OPA – 4.18)
- 2017 SPRING – ME 646 Junior Lab (OPA – 4.65)
- 2017 SPRING – ME 525 Statics (OPA – 4.10)
- 2016 FALL – ME 705 Thermal Systems (OPA – 4.64)
- 2016 FALL – ME 503 Thermodynamics (OPA – 4.38)
- 2016 SUMMER – ME 503 Thermodynamics (OPA – 5.00)
- 2016 SUMMER – ME 525 Statics (OPA – 4.00)
UNH switched to online evaluations after 2015/2016
- 2016 SPRING – ME 646 Junior Lab (OPA – 4.81)
- 2015 FALL – ME 503 Thermodynamics (OPA – 4.81)
- 2015 SUMMER – ME 525 Statics (OPA – 3.88) – taught as an adjunct faculty

TEACHING ASSISTANT

- 2015 SPRING – ME 705 Thermal Systems (OPA – 4.32) TA (Teaching Assistant)
- 2014 FALL – ME 705 Thermal Systems (OPA – 4.76) Instructor
- 2014 SUMMER – UNH Tech Camp – Masters of Flow – Presenter
- 2013 SPRING – ME 503 Thermodynamics (OPA – 4.68) TA
- 2012 FALL – ME 705 Thermal Systems (OPA – 4.34) TA
- 2012 SPRING – ME 503 Thermodynamics (OPA – 4.16) TA
- 2011 FALL – ME 705 Thermal Systems (OPA – 4.75) TA
- 2011 SPRING – ME 646 Junior Lab (OPA – 5.00) TA
- 2010 FALL – ME 747 Senior Lab (OPA – 4.81) TA
- 2010 SPRING – ME 646 Junior Lab (OPA – 4.82) TA
- 2009 SPRING – ME 646 Junior Lab (OPA – 4.85) TA
- 2008 FALL – ME 747 Senior Lab (OPA – 3.60) TA

Teaching Assistant/Instructor

2006 – 2007

Technical University of Sofia

- Taught Physics to freshmen (labs and recitations)
- Fully responsible for an introductory Physics class for international students including developing and delivering all lectures

*The university did not have an evaluation system at the time.

EXTERNAL FUNDING

Northeast Combined Heat and Power Center funded by the Department of Energy. PI for UNH; subcontractor for UMaine. \$600 000 for UNH. 2018

RESEARCH EXPERIENCE

University of New Hampshire 2008 – present

- Combined heat and power plants
- Compact heat exchanger analysis
- Aerodynamics of cyclists in cross-wind
- Numerical and experimental flow analysis of aquaponic systems
- Evaluating and improving flow rate measurements over perforated tiles (relevant to data center cooling)
- Investigating and developing wingtip devices for marine applications (numerical and experimental work)
- Improving optical flow measurement techniques (Particle Image Velocimetry in particular)
- Development of bi-directional hydrofoils – theoretical studies; development of a computational “test bed” for OpenFOAM simulations; obtaining hydrofoil lift, drag, velocity profiles, cavitation characteristics experimentally; data analysis
- Design of a contraction, test section, and diffuser for the UNH High Speed Cavitation Tunnel (HiCAT) – theoretical investigations; parametric studies of components using Fluent; design and drawings; installation; benchmark measurements (PTV, LDV, PIV, pressure measurements)
- HiCAT maintenance and upgrades – budget planning; lab setup; pressure/vacuum system; speed and pressure control; instrumentation

RECENT PUBLICATIONS

- Nedyalkov, I., Lovell, A., and Cunningham, A., “Experimental Investigation of a Drafting Cyclist in Cross-Wind, Proceedings of the 2017 ASME Fluids Engineering Division Meeting, paper FEDSM2017-69398.
- Nedyalkov, I., et al., “Numerical and Experimental Investigation of Flow in Fish Tanks for Small-Scale Aquaponic Systems,” Proceedings of the 2017 ASME Fluids Engineering Division Meeting, paper FED2017-69395.
- I. Nedyalkov and M. Wosnik, “Computational fluid dynamics in undergraduate engineering education – a short introductory tutorial for OpenFOAM, Proceedings of the 2016 ASME Fluids Engineering Division Meeting, paper FED2016-7747.
- I. Nedyalkov and M. Wosnik, “Adaptive-time-step high-frame-rate particle image velocimetry,” Proceedings of the 2016 ASME Fluids Engineering Division Meeting, paper FED2016-7748.
- I. Nedyalkov, J. Shull, I. Gagnon, J. Brindley, and M. Wosnik, “Wingtip devices for tidal turbines: performance improvement and cavitation mitigation,” Proceedings of the 2016 ASME Fluids Engineering Division Meeting, paper FED2016-7750.
- I. Nedyalkov and M. Wosnik, “Performance of bi-directional blades for tidal current turbines,” *Proceedings of the 2014 ASME Fluids Engineering Division Meeting*, paper FED2014-21716.

- M. Mujat, R. D. Ferguson, N. Iftimia, D. Hammer, I. Nedyalkov, M. Wosnik, and H. Legner, “Optical coherence tomography-based micro-particle image velocimetry,” *Optics Letters*, Vol. 38, Issue 22, pp. 4558-4561, 2013.
- I. Nedyalkov and M. Wosnik, “Cavitation investigation of hydrofoils for marine hydrokinetic turbines,” *Proceedings of the 2013 ASME Fluids Engineering Division Meeting*, paper FED2013-16576.

RECENT PRESENTATIONS

- Featured on the Lib Lab youtube series with “the Fluids Rap”: https://www.youtube.com/watch?v=Ig_u8XZr8H8&t=457s
- I. Nedyalkov, A. Cunningham, A Lovell, “Drag and Side Force Reduction for Cyclists in Echelon Formation” – American Physical Society, Division of Fluid Dynamics Meeting, 2017.
- I. Nedyalkov, “The Fluids RAP” – American Physical Society, Division of Fluid Dynamics Meeting, 2016.
- I. Nedyalkov, T. Barreett, A. Wojtowicz, and M. Wosnik, “Wingtip Devices for Marine Applications” – American Physical Society, Division of Fluid Dynamics Meeting, 2016.
- I. Nedyalkov and M. Wosnik, “OpenFOAM for beginners” – American Physical Society, Division of Fluid Dynamics Meeting, 2015.
- I. Nedyalkov and M. Wosnik, “Design of Bi-Directional Hydrofoils for Tidal Current Turbines” – American Physical Society, Division of Fluid Dynamics Meeting, 2015.
- I. Nedyalkov, “Fluid Mechanics in K12 Education” – *UNH Graduate Research Conference*, 2015.
- I. Nedyalkov, J. Shull, I. Gagnon, J. Brindley, and M. Wosnik, “Wingtip Devices for Marine Hydrokinetic Turbines” – American Physical Society, Division of Fluid Dynamics Meeting, 2014.
- I. Nedyalkov, “Theoretical, Numerical, and Experimental Studies of Bi-directional Hydrofoils, *UNH Graduate Research Conference Poster Session*, 2014.
- M. Wosnik, P. Bachant, I. Nedyalkov, M. Rowell, N. Dufrense, and V. Lyon, “Marine Hydrokinetic (MHK) Energy Conversion Research at UNH: From Fundamental Studies of Hydrofoil Sections, to Moderate Reynolds Number Turbine Tests in a Tow Tank, to Open Water Deployments at Tidal Energy Test Sites.” – Abstract for Invited Talk in Ocean Sciences Track at Fall Meeting of American Geophysical Union (AGU), 9-13 Dec, San Francisco, CA., 2013.
- I. Nedyalkov and M. Wosnik, “Performance and Cavitation Characteristics of Bi-directional Hydrofoils” – American Physical Society, Division of Fluid Dynamics Meeting, 2013.
- I. Nedyalkov, “The New UNH High Speed Water Tunnel – Cavitation and Hydrofoil Research for MHK Turbines,” *4th Annual Marine Renewable Energy Technical Conference*, 2013.
- I. Nedyalkov, “The UNH High-Speed Cavitation Tunnel (HiCAT) – A new look into water flows,” *UNH Graduate Research Conference Poster Session*, 2013.

SUPERVISED STUDENTS

SENIOR PROJECTS 2017/2018

- N. Mistretta and J. Moore – Sustainable Surf Board – UNH URC (Ocean Engineering), 1st place faculty choice award, runner up for student choice award; Finalist in the Paul Holloway Prize Competition: 2nd place in the hardware track of the Nelson Poster Competition; 3rd place in the sustainability track of the Bud Albin challenge,
- B. Allen, M. Mateusz, J. Nkounkou – Development of a System for Plastic Manufacturing as an Alternative to Flaring – Finalist in the Social Ventures Innovation Challenge; Finalist in the Paul Holloway Prize Competition – sustainability track of the Bud Albin challenge;
- S. Michalak and R. Bell – Cyclist Aerodynamic Analysis in Cross Wind. The team also developed a detailed experimental procedure for obtaining high-quality data using the UNH student wind tunnel and the 6-component force balance.
- H. Thomas and D. Coombs – project OASIS (Design of Energy Efficient Aquaponic Systems)
- D. Berry – Experimental Studies of a Complex Heat Exchanger. Performed in cooperation with Brayton Energy LLC.
- A. Rand, J. Blum, D. Liu, E. Setear, and N. Schott – ASHRAE Applied Engineering Challenge
- M. Carey, X. Li, C. Baum, and P. Craver – Upgrade and Performance Evaluation of the UNH High-Speed Water Tunnel
(Freshman student involved: D. Cole)

SENIOR PROJECTS 2016/2017

- A. Lovell and A. Cunningham – Cyclist Aerodynamic Analysis in Cross Wind – 1st place at the UNH URC (Mechanical Engineering Research), 1st place student choice award (Mechanical Engineering)
- D. Seksinsky, S. Romero, J. Stickney, E. Pirie et al. – Project OASIS (Design of Energy Efficient Aquaponic Systems).
- R. Colburn, S. Kay, C. Spillane, S. Triglione, E. Underwood – Data-Center Cooling Analysis Using CFD Modeling Techniques and Experimental Investigation of Perforated Tiles.
- J. Skinner – Evaluation of Compact Heat Exchangers with OpenFOAM.
- A. Larson, C. Matthews, J. Couture – Design of Wingtip Devices for Marine Applications.

SENIOR PROJECTS 2015/2016

- D. Gottschalk – Design of Piezoelectric Shaker for Frequency Test Applications – 2016 (spring semester only). 1st place at the UNH URC (Mechanical Engineering)
- S. Nigam, P. Balcom, W. Taveras, et al., – Project OASIS (Design of Energy Efficient Aquaponic Systems). The team received \$2000 for a third place in the Social Ventures Innovation Challenge, a \$13 500 grants from the Emeritus Council SISI at UNH, summer seed grant of \$7000 and an additional \$9000 in other grants. 1st place at the UNH URC (Ocean Engineering)

- M. Bemis, T. Reeve, C. Gernhard, and J. Titcomb – Data Center Cooling Simulations and Analyzing Flows through Perforated Tiles. Performed in cooperation with Applied Math Modeling Inc. The team received a \$4000 grant from ASHRAE.
- Z. Patnaude, N. Shaw, and P. O'Connor – Brayton Energy Solar Receiver Analysis. Performed in cooperation with Brayton Energy LLC. – Honorable Mention at the UNH URC (Mechanical Engineering)
(Junior students involved: J. Couture and C. Matthews)
- T. Barrett and A. Wojtowicz – Design of Wingtip Devices for Marine Applications. Honorable Mention at the UNH URC (Ocean Engineering)
(Junior student involved: A. Larson)

SENIOR PROJECTS 2014/2015

- Gagnon, W. Hall, and T. Kroll – Modeling of Wind Turbine Arrays.

SENIOR PROJECTS 2013/2014

- J. Brindley and J. Shull – Developing Hydrokinetic Wingtip Devices. The team received First Place Poster Award (Mechanical Engineering) at the UNH URC and the David Drew Memorial award for best Ocean Engineering Project.
(Junior student involved: I. Gagnon)

SENIOR PROJECTS 2011/2012

- R. Therrien, B. Comtois, and S. Roux – Design of a High-Speed Water Tunnel Force Balance. The team received the David Drew Memorial award for best Ocean Engineering Project.

ADVISING STUDENTS FOR UNDERGRADUATE RESEARCH

- 2018 D. Cole – (TBD) (UNH URA)
- 2017 K. Cole – Numerical Investigation of Wingtip Devices with Focus on Cavitation in Marine Applications (UNH SURF)
- 2017 E. Grissino – Investigating the Effects of Surface Roughness on Bi-Directional Hydrofoils (UNH URA)
- 2016 K. Cole – Investigating Roughness Effects on Bi-directional Hydrofoils (UNH REAP)
- 2016 C. Badylak-Reals – Experimental Study of Biofouling on Marine Wingtip Devices (UNH URA)
- 2015 I. Gagnon and B. Mitchel – Wingtip Cavitation
- 2014 I. Gagnon – Evaluating the Performance of a Water Tunnel Force Balance
- 2012/2013 N. Landry, S. Nigam, and Z. Xu – short-term undergraduate research

SERVICE

SERVICE WITHIN UNH 2017/2018

- Written recommendations for undergraduate students (over 20 students)
- Keeping track of/lending/organizing lab equipment
- Served on the UNH URC committee
- Tour of DEKA research for CFD class; hosted representative from DEKA research twice at UNH
- Judge for the 3-Minute Thesis Challenge Competition UNH 2018 (all 4 rounds)
- Established the UNH ASHRAE group; served as chapter advisor
- Ocean Discovery Day presenter (High Speed Water Tunnel)
- Advised MEng. student Aleksandra Wojtowicz for her final project
- Substituted for the ME 523 class (3 lectures)
- Helped with OISS events (international student orientation; performed at “Global Cafe”)

SERVICE WITHIN UNH 2016/2017

- Keeping track of/lending/organizing lab equipment
- Written recommendations for undergraduate students
- Judge for the 3-Minute Thesis Challenge Competition UNH 2017
- Substituting for the ME 503 class (3 lectures)
- Guide for the Admitted Students Day
- Ocean Discovery Day volunteer
- Chase Ocean Engineering building Open House volunteer
- Panelist for the “Job Search and Negotiation” workshop at UNH organized by the graduate school
- Assisted the local ASME group
- Assisted sophomore Physics students with wind tunnel experiments

SERVICE WITHIN UNH 2015/2016

- Keeping track of/lending/organizing lab equipment
- Written recommendations for undergraduate students
- Fulbright Campus Interviewer
- Judge for the 3-Minute Thesis Challenge Competition UNH 2016
- Guide for the Admitted Students Day
- Ocean Discovery Day presenter (High Speed Water Tunnel)
- High Speed Water Tunnel Demos
- Experiential Learning Activity for the ME 503 2016 spring class
- Assisted the local ASME group – connecting them to local industries
- Assisted a freshman ME student in performing wind tunnel experiments
- Graduate student orientation for international students – panelist
- UNH PechaKucha event presenter

- Volunteer at International Community Reception
- Accommodated an ESL student visiting one of my classes

SERVICE WITHIN UNH BEFORE 2015

- Maintaining the High Speed Cavitation Tunnel Lab
- Written recommendations for undergraduate students (5 students 6 recommendations)
- Ocean Discovery Day presenter in 2013 and 2014
- Golden Key Honor Society board member 2010/2011

SERVICE OUTSIDE OF UNH

- Track co-organizer for the Fluids Engineering Division Summer Meeting of the American Society of Mechanical Engineers 2014 – present
 - Forum on Cavitation and Multiphase Flow
 - Symposium on Industrial and Environmental Applications of Fluid Mechanics
- Member of the Fluid Measurement & Instrumentation Technical Committee of the FED of the ASME 2017 – present
- Member of the Fluid Applications and Systems Technical Committee of the FED of the ASME 2014 – present
- Member of the Multiphase Flow Technical Committee of the FED of the ASME 2013 – present
- Judge for the inaugural ASME FEDSM Flow Visualization Competition – 2017

REVIEWED JOURNAL PAPERS

- ASME Journal of Fluids Engineering: 3 papers
- ASME Journal of Engineering for Gas Turbines and Power: 2 papers
- International Journal of Heat and Fluid Flow: 2 papers + 1 under review
- Biotechnology & Biotechnological Equipment: 2 papers

REVIEWED CONFERENCE PAPERS:

American Society of Mechanical Engineers, International Mechanical Engineering Congress & Exposition

- at least 10 papers (under review): Advances in Aerospace Technology Track; Fluids Engineering Track; Energy Track; Design, Reliability, Safety, and Risk Track; Heat Transfer and Thermal Engineering Track; Engineering Education; Biomedical & Biotechnology Engineering Track 2018
- 7 papers: Advances in Aerospace Technology Track; Fluids Engineering Track 2017

American Society of Mechanical Engineers, Fluids Engineering Division Summer Conference

- 3 papers (Symposium on Industrial and Environmental Applications of Fluid Mechanics; Boundary Layer and High-Speed Flows) note: website was changed so track organizers could not be “reviewers” of papers in their track. 2018

- 12 papers (Symposium on Industrial and Environmental Applications of Fluid Mechanics; Forum on Cavitation and Multiphase Flow; International Symposium on Flow Applications in Aerospace; Symposium on Fundamental Issues and Perspectives in Fluid Mechanics; Symposium on Bio-Inspired Fluid Mechanics) 2017
- 11 papers (Symposium on Industrial and Environmental Applications of Fluid Mechanics; Forum on Cavitation and Multiphase Flow; International Symposium on Fluid Power; Symposium on Noninvasive Measurements in Single and Multiphase Flows; Graduate Student Paper Competition) 2016
- 7 papers (Symposium on Industrial and Environmental Applications of Fluid Mechanics, Symposium on Fundamental Issues and Perspectives in Fluid Mechanics) 2015
- 5 papers (Forum on Cavitation and Multiphase Flow) 2014
- Judge for the Nottingham Science Fair 2016 – present
- Judge for the Solar race car Middle/High school competition 2016 – present
- Presentation/STEM activities at Seabrook Elementary School 2016

NOTABLE AWARDS

- The 2014 Fluids Engineering Division (*FED*) *Graduate Student Scholarship Award* from the American Society of Mechanical Engineers (*ASME*)
- The 2013 Fluids Engineering Division (*FED*) *Graduate Student Scholarship Award* from the American Society of Mechanical Engineers (*ASME*)
- UNH *Dissertation Year Fellowship Award* for 2013/2014
- UNH Summer *Teaching Assistant Fellowship Award* in 2010 and 2013
- *Sign of Sofia* award from the municipality of Sofia, Bulgaria 2007
- *Finalist* in the national round of the *FAMELAB* science communication competition (aired on national TV) 2007
- *Student of the Year* award (science) – *Ministry of Education* in Bulgaria 2006
- *Diploma* for outstanding achievements in international and national competitions from the *President of Bulgaria* 2006
- *Mini-Nobel prize in Physics* from the embassy of Sweden in Bulgaria 2005
- *30+ awards* from national (Bulgarian) and international competitions in *Physics, Mathematical and Computational Linguistics, and Mathematics* 1994 – 2007

ACTIVITIES

- Served as a Golden Key Honour Society board member 2010/2011
- Served as student senate member at the Technical University of Sofia 2003 – 2007
- Organized events promoting science
- Science outreach (currently working on a Fluid Mechanics Rap)
- Appeared in TV and radio productions
- Waysmeet board member 2016 – present
- Volleyball:
 - Maine State Volleyball Association: C level player from 10/2017 to 12/2017; C+ level from 12/23/2017
 - Biddeford Men’s Volleyball A League 2017/2018 champion
 - Two times champion and five times runner-up in the MSS (and former NHSSC) volleyball league

- Seacoast Invitational Tournament – Hampton 2018 champion
- Shamrock Serve volleyball tournament 2017 champion; 2018 runner-up
- Hits for Heroes 2017 tournament 2017 runner-up
- UNH intramural men’s volleyball champion 2017

- Rap:

- Fluids rap (project in progress)
- Rap workshop at Riverwoods Retirement Community 01/2018
- “Dreams” music video 2011:
<https://www.youtube.com/watch?v=ATyNyhMfiNc>
- Over 10 recorded songs 2002 – present

DIVERSITY COMMITMENT	<i>International Orientation Leader</i> University of New Hampshire	2012 and 2013
	<i>International Reception Committee Member</i> Chalmers University of Technology, Sweden	2008
	<i>Instructor for International Students</i> Technical University of Sofia, Bulgaria	2007
SOFTWARE SKILLS	MATLAB; OpenFOAM; Fluent; LabVIEW; SolidWorks; ProE (PTC Creo); L ^A T _E X; Adobe Flash; Adobe InDesign; sound, graphics, and video editing.	