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# Beverley YEO

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Research engineer with both experimental and computational fluid dynamics (CFD) experience seeking to develop better, faster, and more accurate turbulence models and CFD schemes using generalizable data-driven approaches.

## EDUCATION

**Nanyang Technological University, Singapore (NTU)**

*Master of Engineering (Mechanical & Aerospace Engineering)* Aug 2021 - Feb 2023
Thesis: Investigating Galilean invariance in CFD

*Bachelor of Engineering (Aerospace Engineering), Honors with Distinction* Aug 2017 - Jun 2021
Thesis: On the flow behavior of confined vortex-rings

**Purdue University, West Lafayette, IN, USA** – *Study abroad* Jan 2020 - May 2020

## PUBLICATIONS & PRESENTATIONS

**Journal Papers**

- New T.H., Yeo K.W.B., Koh J.Y., Long J. (2023). *Flow transitions of vortex rings colliding head-on with free surfaces*. Submitted to *Journal of Fluid Mechanics* (Apr 2023), under review.
- Yeo K.W.B., Chan W.L., Elhadidi B. (2023). *Challenging the Galilean Invariance assumption in CFD*. In preparation.
- Yeo K.W.B., Koh J.Y., Long J., New T.H. (2020). *Flow transitions in collisions between vortex-rings and density interfaces*. Journal of Visualization 23:783-791. doi:10.1007/s12650-020-00666-7

**Conference Presentations**

- Yeo K.W.B., Koh J.Y., Long J., New T.H. (2019). *Flow transitions in collisions between vortex-rings and density interfaces*. 15th Asian Symposium on Visualization, Busan, South Korea, 2019.
- Yeo K.W.B., Koh J.Y., Long J., New T.H. (2019). *Flow transitions in collisions between vortex-rings and free surfaces*. 17th European Turbulence Conference, Turin, Italy, 2019.

## RESEARCH EXPERIENCE

**Influence of high transonic Mach number on aerodynamic forces for high frequency modes** **Aug 2022 - present**
*Institute of High Performance Computing (IHPC), A*STAR* *Supervisors: Dr. Daniel WISE, Dr. Vinh-Tan NGUYEN*

- Project funded by Bombardier Inc. under Singapore Aerospace Programme Cycle 16.
- Implemented optimal time period algorithm and computed generalized aerodynamic forces and coefficient matrices of 2D/3D CRM, NASA and AGARD wings in transonic flow with SU2 harmonic balance code for use in aeroelastic analyses.

**Investigating Galilean invariance assumptions applied to CFD** **May 2021 - present**
*School of Mechanical & Aerospace Engineering, NTU* *Supervisors: Dr. Wai Lee CHAN, Dr. Basman ELHADIDI*

- Project funded by Ministry of Education Academic Research Fund Tier 1 Grant.
- Computed wakes and forces from flow over cylinder in different reference frames with LES and DNS in OpenFOAM.
- Co-supervised an undergraduate final-year project student and provided technical assistance with ANSYS Fluent.
- Initiated a collaboration with IHPC, A*STAR to process and perform modal decomposition on turbulent LES results.

**On the flow behavior of confined vortex-rings** **Dec 2020 - Jun 2021**
*School of Mechanical & Aerospace Engineering, NTU* *Supervisor: Dr. Daniel NEW*

- Computed flow properties of vortex-rings in confined cylindrical geometries using Unsteady RANS in ANSYS Fluent to investigate wall shear stress and pressure distributions induced by vortex-rings on walls of confinement geometry.
- Experimentally validated results of CFD simulations using colored dye flow visualization.
- Assisted with supervision of three undergraduate students by providing basic CFD training and data analysis.

**Fusing engineering knowledge with communication skills** **May 2020 - Jun 2021**

*College of Engineering, NTU* *Supervisor: Dr. Wai Lee CHAN*

- Project funded by Ministry of Education Tertiary Research Fund Grant.
- Analyzed statistics from participants' pre- and post-treatment test scores using ANOVA and MANOVA in MATLAB.
- Analyzed and summarized student participants' qualitative learning outcomes and feedback.
- Built webapp using NodeJS and SQL to automate participant attendance checking.

**Investigating flow transitions in vortex-ring collisions** **Dec 2017 - Aug 2020**

*School of Mechanical & Aerospace Engineering, NTU* *Supervisor: Dr. Daniel NEW*

- Performed flow visualization of vortex-ring collisions with density interfaces and free surfaces using planar laser-induced fluorescence (PLIF) and time-resolved particle-image velocimetry (TR-PIV) techniques.
- Processed TR-PIV data in MATLAB to obtain velocity and vorticity vector fields.

**Simulations of propeller aeroacoustics (internship)** **Jun 2020 - Aug 2020**

*Temasek Laboratories @ National University of Singapore*

- Simulated and analyzed aerodynamic properties and aeroacoustics of unsteady flows using ANSYS Fluent.
- Generated meshes of propeller models from CAD files using Pointwise.

## HONORS & AWARDS

**2022** A*STAR National Science Scholarship (PhD) – *Full funding for doctoral studies under government sponsorship*

**2021** T.H. New Flow Visualization Award – *Best flow visualization done by final-year project students*

**2020** AY2019/20 Dean's List, School of Mechanical & Aerospace Engineering, NTU
Spring 2020 Dean's List, Purdue University Aeronautics & Astronautics
CNYSP Research Award (Gold)

**2019** Best Presentation Student Award, 15th Asian Symposium on Visualization

**2017** Nanyang Scholarship (CN Yang Scholars Programme) – *Full funding for undergraduate studies*
NTU College of Engineering Dean's Award and MAE Enrichment Grant – *S$12,000 total*

## ACADEMIC AFFILIATIONS

International Forum for Aviation Research (IFAR) Early-Career Network Jan 2023 - present

Agency for Science, Technology and Research, Singapore (A*STAR) Aug 2022 - present

## ACADEMIC SERVICE

**Scientists-in-Schools Program, Zhangde Primary School** **Sep 2022 - Apr 2023**

- Developed lesson plan and introduced Primary 5 students to Python programming and CFD/scientific computing.

**Peer Instructor, CN Yang Scholars Club** **Sep 2019 - Aug 2020**

- Tutored junior CN Yang Scholars majoring in aerospace engineering by demonstrating solutions to example questions and preparing material to supplement lecture notes for aircraft propulsion and aerodynamics.

## SKILLS

**Programming** MATLAB, C, C++, Python, Javascript, HTML, CSS, NodeJS, SQL, Bash scripting, LaTeX

**Software** SolidWorks, ANSYS Fluent, OpenFOAM, SU2, TECPLOT, Paraview, Pointwise, Photoshop, Illustrator

**Languages** English (native), Mandarin (fluent), Korean (basic)

– References available on request.