Nikolaos Kalogeropoulos, MEng, AFHEA

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Education

10/2021 - today: PhD Candidate in Wildfire Modelling, HAZELAB, Imperial College London

- Funded by EPSRC, working in the **Hazelab** Group to research forest fire propagation simulation. Current research includes wildfire propagation models, model result postprocessing, wildfire and sustainable policy, and wildfire safety. Continuing work from Master's project on developing algorithms to calculate the safety boundaries around urban areas, whereby the physical limit which the fire can reach before it becomes a danger to an inhabited area is calculated.
- Working on the WUI-NITY project, funded by NIST and NRC Canada, to integrate multiple fire simulation algorithms and safety boundary algorithms. Working on the RACEWildfire Project by NRC Canada to investigate and use the Prometheus fire simulation software, and model the smoke production of fire through atmospheric dispersion modeling.
- Created a script (k-PERIL) written in C# .NET and packaged as a DLL that takes in completed fire simulation data and calculates the probabilistic safety boundaries for a specified urban area, based on work of a previous student (PERIL by Harry Mitchell). It is the first safety boundary tool that creates probabilistic outputs, providing more data to the user and allowing for better-informed decision making. Created a Fire Simulation Scenario Subroutine, to create all necessary input files for a fire simulation, based on some simple command-line inputs.
- Working on a modified Gaussian Atmospheric Smoke Dispersion model in MATLAB. The aim of the model is to quickly estimate the smoke plume of a wildfire and produce ground level visibility maps. It is currently under development, and uses FOFEM emission data to estimate the concentrate the particulate matter content at any point in the plume.

10/2017 – 06/2021: Meng Mechanical Engineering, Imperial College London, First Class Honors (72.6%)

- Modules included: Computational Fluid Dynamics (66%), Combustion (70%), Optimisation (95%), and Thermodynamics and Energy (90%),
- **Paid Course Coordinator, Mechanical Design in Third Year Chemical Engineering (Autumn 2019 - today)**
  - Produced learning materials and course objectives to teach a crash course on Solidworks, designed to introduce the students in CAD design and engineering drawings. Organized and ran two pilot courses with differing demographics to identify problems with the established way of teaching.
  - Produced a series of videos to convert the course to an online-only module due to the COVID-19 pandemic. Organised online tutoring sessions as a replacement of in-person help.
  - Was the first Undergraduate Teaching Assistant to be hired in the Chemical Engineering Department.
- **Design, Make and Test 3rd year project (10/2019 – 06/2020)**
  - Designed, made and tested a vessel that remotely navigates bodies of water, collects, analyses and transfers real time pollution data, and collects physical water samples, to be taken back to a lab for further analysis.
  - Design and manufacture Lead supervised and worked on all stages of the design of the vessel to ensure cohesion and manufacturability. Worked on and maintained the main CAD assembly. Wrote manufacturing plans of all machined components and machined all metal parts.
  - Ran vessel stability simulations to replace practical testing as a response to the COVID-19 pandemic.

Work experience

- **Mechanical Engineer, Solena Materials (06/2022 – today)**
  - Hired as the only engineer to develop and construct laboratory rigs for the production of sustainable fabrics. Needed to solve problems regarding corrosion and material compatibility, fire safety, large-range adjustability,

rigidity and potential for future upgrades. Designed the spooling mechanism for the fabric and an automatically-filtered liquid bath. Project is still ongoing, in the manufacturing phase.

- **Mechanical Lead, Swift Robotics (12/2020 – 04/2021)**
  - Designed and manufactured an autonomous robot which navigates hospital buildings and disinfects the rooms and corridors with high power UVC light, in a timeframe of four months. The robot is made modular, so the UV module can easily be taken off the moving base and swapped with modules developed in the future.
  - Lead the main wheel shaft subassembly and the UV module design process. Designed all parts in CAD to be manufacturable despite limited manufacturing capabilities, because of the COVID-19 pandemic. Had to cope with strict size limits and ever-increasing demands for the features and physical internal contents of the robot.
  - Used a mix of traditional metal-based and novel additive manufacturing methods to manually build all parts. Proceeded with general assembly and troubleshooting thereof. Wrote documentation for all relevant parts.
- **Lead Design Engineer, Research and Development Lead at ALROSE British Gas Springs (12/2019- 07/2021)**
  - Worked as the Lead Design Engineer at ALROSE British Gas Springs, a leader in the Marine Gas Spring sector.
  - Interviewed, hired, and lead a team of 5 engineers for an intensive internship program during the summer of 2021. The team worked on a variety of projects, including implementing LEAN principles in the manufacturing process, designing and making bespoke products and novel manufacturing tools, and maintaining detailed documentation. Individual responsibilities included overseeing progress and offering technical and manufacturing insight. Also worked on designing a novel product for a demanding customer specification, manufacturing new safety equipment, and manufacturing equipment, and composing engineering manuals.
  - Responsible for all bespoke customer orders. Communicated with customers to assess their situation, recommend a suitable gas spring, and design the method and dimensions of mounting.
  - Reworked and improved the internal algorithms for simulating gas-spring response through a moment-based dynamics analysis. Packaged the results in an easy-to-use, reproducible spreadsheet-based platform.

Other Experience

- **"Protection Pod" Aerosol Protection Cover**
  - Designed a dental chair add-on that protects the operator from all COVID-19 aerosols produced during dental operations, reducing infection rates, patient turnover time, and the need for expensive and scarce PPE.
  - Designed, made, and tested a series of prototype products with the intention of future mass production. Organised all logistic and acquisition challenges, working both on-site and remotely.

Accreditations

- **CSWP** (September 2022): Passed the SOLIDWORKS Professional Mechanical Design Certification, demonstrating my ability to design and analyse parametric parts and moveable assemblies using a variety of complex features in SOLIDWORKS software.

Publications

- Mitchell, H., Gwynne, S., Ronchi, E., **Kalogeropoulos, N.** & Rein, G. (2023) Integrating wildfire spread and evacuation times to design safe triggers: application to two rural communities using PERIL model. *Safety Science*.
- Ronchi, E., **et al.** (2021) WUI-NITY 2: the integration, verification, and validation of the wildfire evacuation platform WUI-NITY. *NFPA*.
- **Nikolaos Kalogeropoulos**, et. al. (2020) Facilitating Independent Learning: Student Perspectives on the Value of Student-Led Maker Spaces in Engineering Education. *International Journal of Engineering Education.*
- Masen, Marc **et. al.**, Evaluating Lubricant Performance to Reduce COVID-19 PPE-Related Skin Injury (July 3, 2020). Available at SSRN: https://ssrn.com/abstract=3642575 or http://dx.doi.org/10.2139/ssrn.3642575