Ankit (Andy) Kapoor

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Education

Duke University, The Pratt School of Engineering — Durham, NC
M.S. in Materials Science & Engineering, and AI For Materials Certificate — Expected May 2026
Affiliations: Duke Materials Initiative, AI Hackathon, Duke aiM, Duke Quant, Golf Club

Concordia University Irvine — Irvine, CA
B.S. in Biochemistry, minor in Computer Science — 2021 - 2024
Affiliations: ODK National Honors, Tri-Beta Biological Honors, American Chemical Society Branch VP, PhiDE

Related Projects

Composition & Bandgap Characterization in Doped Hybrid Organic-Inorganic Perovskite Semiconductors
- Spin-coating and physical vapor deposition fabrication of solution-processed perovskite semiconductors, for characterization using electron microscopy, UV-Vis spectroscopy, and optical microscopy methods.
- Bandgap assessment in doped perovskite thin films, for comparison with DFT computational models.

Machine Learning Model Development for Relativistic Density Functional Theory in Hybrid Semiconductors
- Machine learned interatomic potential development for metal-halide and hybrid perovskite semiconductor materials.
- Performed Quasi-4-Component DFT point calculations using FHIaims all electron materials simulation package in Linux.
- Parallelized computational workflows in Linux compute clusters, increasing Python molecular dynamics efficiency by 90%.

HybriD3 Paper Similarity Search Tool: AI-Powered Paper Retrieval for Hybrid Semiconductor Research
- Developed Python-based cosine similarity searches of SciBERT language model vector embeddings of scientific paper metadata, to enhance relevant paper retrieval from the Hybrid Cubed hybrid perovskite materials database.
- Enabled 4-component similarity scoring of sample metadata collected with a CrossRef API implementation.
- Developed a Flask-based interface, simplifying AI-powered similarity searches for researchers studying hybrid perovskites.

Work Experience

IT & Bioinformatics Employee — Costa Mesa, CA
Southern California Coastal Water Research Project — Sep 2023 - Jul 2024
- Led sequence analyses with QIIME 2 on Linux for Environmental DNA studies, achieving statistical analyses and visualizations for publications using R and Python.
- Automated custom data retrieval on Linux servers with NCBI Entrez, significantly reducing manual workload.
- Increased match rates in alignments by over 30% by creating custom reference libraries in rCRUX to optimize sequence identification for coastal water samples.
- Developed an HTML website to improve data accessibility for study sites.

Computer Engineering Laboratory Employee — Irvine, CA
Concordia University Irvine — May 2023 - Dec 2023
- CAD modeled and resin 3D printed 4 iterations of custom support and mounting parts for autonomous drone components like the camera, flight controller, and antenna, resulting in improved long distance stability and performance.
- Improved control reliability by testing operating conditions for manual control, allowing more robust functionality.
- Conducted research and development on the university's autonomous drone project.

Molecular Biology Laboratory Manager — Irvine, CA
Concordia University Irvine — Jan 2023 - Sep 2023
- Managed the molecular biology lab space and ensured a well-organized environment to support student research.
- Advanced genetic research through site-directed mutagenesis studies of Amyotrophic Lateral Sclerosis related genes.
- Conducted mutagenesis protocols, protein purification methods, growth assays, primer design, Sanger sequencing, Qubit fluorometer quantification, IR spectroscopy and various methods for efficient and accurate experimentation.
- Created bacterial stocks, stock plates, and specialized media to consistently provide resources for ongoing experiments.

Skills

Laboratory Instruments: Cleanroom Photolithography, X-Ray Diffraction, Electron Microscopy, X-Ray Photoelectron Spectroscopy, UV-Vis Spectroscopy, Atomic Force Microscopy, Reflectometry, Autoclave
Fabrication: 3D Printing (mSLA, FDM), Fusion360, Laser Cutter, CNC ShopBot, MeshMixer, Cura, ChituBox
Programming: Python, R, Linux, Bash, C#