Ankit (Andy) Kapoor

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Education

Duke University — 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, PhiDE

Related Projects

Composition & Bandgap Characterization in Doped Hybrid Organic-Inorganic Perovskites
- Comprehensive assessment of bandgaps in doped semiconductor material, for comparison with computational models.
- Experimental characterization of solution-processed perovskite semiconductors using UV-VIS spectroscopy, photoelectron spectroscopy, and optical spectroscopy.

Machine Learning Model Development for Q4C Density Functional Theory
- Machine learned interatomic potential development for hybrid perovskite semiconductor materials assessment.
- Performed Quasi-4-Component DFT point calculations using FHIaims materials simulation package.
- Scaled computational workflows in Linux compute clusters, increasing molecular dynamics efficiency by over 90%.

HybriD3 Paper Similarity Search Tool: AI-Powered Paper Discovery for Hybrid Perovskite Research
- Implemented component-wise 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.
- Optimized sequence identification by creating custom reference libraries in rCRUX, improving match rates in alignments by over 30%.
- Developed an HTML website to improve data accessibility for study sites.

Computer Engineering Laboratory Employee — Irvine, CA
Concordia University Irvine — May 2023 - Dec 2023
- Conducted research and development on the university's autonomous drone project.
- Designed and 3D printed 4 iterations of custom support and mounting parts for 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.

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: X-Ray Diffraction, UV-Vis Spectroscopy, IR Spectroscopy, Photoluminescence Spectroscopy, Electron Microscopy, Atomic Force Microscopy, Optical Microscopy, Lithography, Thermocycler, Autoclave
Fabrication: 3D Printing (mSLA, FDM), Fusion360, WaterJet, Laser Cutter, CNC Mill, MeshMixer
Programming: Python, R, Linux, Bash, C#