CHRISTOPHER K. DENQ (THEY/HE)

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SUMMARY

Christopher Denq is a sophomore in mathematics with 4.5 years of experience in industry, academia, and policy. As a college re-entry student, their diverse experience in the art market (art authentication/forgery detection) and data science augments their creative problem-solving, data communicability, and research perspective.

Chris is passionate about the creative-visual aspects of AI, particularly in how visual meaning can be captured and conveyed. Specifically, they are most interested in questions of visual authentication (deepfake classifications). In the mid-term, Chris is committed to pursuing a PhD in CS, AI, or HCI.

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EDUCATION (back to top)

University of Illinois Springfield | Springfield, IL

B.A., Mathematical Sciences — Dec 2022 – Exp. May 2026
- Differential Equations
- Linear Algebra
- Operations Research Methods
- Probability Models (Mathematical Statistics I)
- Topics in Math: Mathematics & Framework Behind GPT
- IPL 300: Internship in Mathematics
- IPL 301: Project in Mathematics

Foothill College | Los Altos Hills, CA

A la carte courses at Associates level, Mathematics — Apr 2022 – Dec 2022
- Multivariate Calculus (Calculus IV)
- Discrete Mathematics
- Elementary Statistics
- Object-Oriented Programming (Python I)
- Intermediate Software Design (Python II)
- Advanced Data Structures and Algorithms (Python III)
- Intro. Cloud Computing

University of Pennsylvania | Philadelphia, PA

B.A. in Philosophy and Art History — Aug 2015 – Dec 2017, Jan 2019 – May 2021

WORK EXPERIENCE (back to top)

United States Department of Defense — Jun 2023 – Present

Data Scientist | Washington, DC & Crane, IN — PIs: Dr. Gregory Forcherio, Dr. John Dilger

Data Scientist (NSWC: Crane & University of Illinois Springfield Co-op)
- Invited to continue project after successful NSIN Fellowship under NSWC: Crane & University of Illinois Springfield co-op
- Refactored over 12k lines of code to future-proof for additional data formats and account for new project scope (Crane decided to expand previous app into an entire platform to house all future analytics products for the research division)
- Developing new clustering model to categorize meta-data, which would in turn improve user comprehension of graphs
- Revamping UI and streamlined functionalities down to 5 robust graphs that better target research questions
- Coordinated with 2 cross-functional defense teams across 6 staffers and 2 research executives for product development

Data Scientist (NSIN Fellow)
- Handpicked as top 5% finalist (50 of 950) to spearhead AI initiative at NSWC: Crane through NSIN's X-Force Fellowship
- Engineered full-lifecycle NLP app that scrapes, stores, and analyzes upwards of 2TB of paper data for Crane research lab
- Optimized NLP parsing speed by 1400%; maintaining both front-end UIX platform and 7 back-end analytics functionalities
- AI project's output informs stakeholders like Crane Director of Research on $3.5M research budget, direction, and policy

Adobe Inc.
Data Scientist (Digital Academy) | San Jose, CA   Mar 2023 – Jun 2023
- Handpicked as top 0.8% finalist (25 of 3000) to participate in Adobe Digital Academy's Data Science Fellowship
- Awarded $26,000 to complete 300+ hours of instructor-led AI education along with Adobe workload
- Engineered 3 projects for Adobe Digital Academy, including NLP classification model for tagging AI-generated text
- 20% Project & Firm Initiative: developed CNN computer vision model for identifying deepfakes and edited images

Tzu Chi Medical Foundation
Data Analyst (Contract) | Alhambra, CA   Nov 2022 – Mar 2023
- Optimized patient treatment speed by 25% through streamlining office workflow (automated forms and data insights)
- Engineered 12 data products (dashboards, databases) to inform 25 medical staff operating across 4,200 patients

PNC Financial Services Group, Inc.
Data Analyst Intern | Brecksville, OH   Jun 2022 – Aug 2022
- Saved $375,000 via data-informed recommendations on improvements to internal loan pipeline
- Engineered 8 data products (optimization scripts, server dashboards) to report across 4 teams and 300 employees

2U Educational Services
Data Analyst Assistant Instructor | Remote   May 2022 – Nov 2022
- Lead cohort of 35 students in team of 3 teaching staff across 24 weeks of instruction with a 100% graduation rate
- Supported additional 210+ hours of code review and tutoring in weekly sessions and open office hours

Wyzant
Freelance Computer Science Tutor | Remote   Sep 2021 – May 2022
- Tutored 25+ students from high school to adult learners for 65+ hours on various computer science problems
- Succeeded in helping 25+ students raise their test scores by average of 2.7 letter grades

Art Market (Aggregated)
Art Analyst, Curator, Docent, Gallery Intern | Philadelphia, PA & New York, NY   Jun 2016 – Aug 2022
- Aggregated 3 years of work experience including internships, part-time, and cooperatives across 5 art institutions, notably **Christie's** (premier art auction house) and **Philadelphia Museum of Art** (world-leading art museum)
- Directly contributed to sales (art auction, galleries), openings (galleries, museums), tours (galleries, museum), and donations (museum) that totaled $0.9M in revenue
- Analyzed market trends, managed price growth strategies, and maintained/curated for collections totaling $400M+
- Lead and maintained 5 customer-facing long-standing relationships (purchasing clients and museum donors)
- Conducted deep literary, market, and media research across 20 artworks, contributed to 3 art catalogues, and attending 2 vernissages (private showings) as primary contact
- Led 6 docent tours, 2 gallery tours, and 2 gallery/museum openings

TECHINCAL RESEARCH EXPERIENCE (back to top)

Kong Research Group, University of Illinois Springfield   Sep 2023 – Present
Mathematical AI Researcher | Springfield, IL   PI: Prof. Liang Kong
- Supervised by Prof. Liang Kong and his research group, which seeks to understand and augment AI practices through math
- Researching application and interpretability of novel PINNs (Physics-Informed Neural Networks) in modeling problems
- Specifically, researching encoding methods for PDE, ODE-based loss-functions and stochastic gradient descent behavior in PINN-induced architectures

Cambridge AI Safety Hub (CAISH), Cambridge University   Jan 2023 – Feb 2023
CAISH Machine Learning Fellow | Cambridge, England   Supervisor: Hannah Erlebach (CambridgeEA)
- Handpicked as top 6% finalist (30 of 500) to partake in CaMLAB Fellowship (2-month curriculum for AI safety engineering)
- Self-educated on machine learning concepts, including neural networks and deep learning, within the context of AI safety
- Engaged in pair-programming to work on transformer interpretability, model training, and hyperparameter tuning

AI-X Group (Hsu Research Team), California State University: Northridge   Nov 2021 – May 2022
Machine Learning Research Assistant (Curriculum) | Northridge, CA   PI: Prof. Wenchin Hsu
- Researched ML education pedagogies and curriculum development for Prof Hsu's Spring 2023 graduate ML course
- Succeeded in delivering 280+ slides, 10+ Java-to-Python code conversion, and applying mathematics to education

Systems Biology Laboratory, University of Florida   Jun 2012 – Sep 2013
Machine Learning Research Assistant (Bioinformatics) | Gainesville, FL   PI: Prof. Su-Shing Chen
- Researched optimal parameter space for SVM techniques to detect influential biomarkers for Alzheimer's
- Co-authored research paper; published in Journal of Clinical Bioinformatics

GOVERNANCE RESEARCH EXPERIENCE

CEN-CENELEC JTC21, European Parliament   Mar 2023 – Present
AI Governance Researcher | Brussels, Belgium & Eindhoven, Netherlands   PI: Dr. Koen Holtman
Senior Standards Contributor (AI Standards Lab)
- Personally onboarded as contributor to AI Standards Lab (Holtman's policy group) after successful AISC8 contract
- Synthesizes contemporary AI safety literature to convert to legal drafts for JTC21
- Reviews legal formats and paper content of junior contributors; advises junior contributors on relevant AI safety sources

Standards Contributor (AISC8 Fellow)
- Handpicked as top 5% finalist (8 of 150) for AI Safety Camp 8's Public Policy project
- Staffed to Dr. Koen Holtman, Dutch rep. to CEN-CENELEC JTC21 (technical committee to European Parliament and drafting contributor to the EU AI Act)
- Developed minimally acceptable best practices for AI risk management systems to support JTC 21 knowledge base
- Specialized in informational hazards and risk levels from unregulated GPAI/LLM models at both the user and societal level

Cambridge AI Safety Hub (CAISH), Cambridge University   Nov 2023 – Dec 2023
CAISH Policy Fellow | Cambridge, England   Supervisor: Gabor Fuisz (CambridgeEA)
- Handpicked as top 16% finalist (50 of 300) to partake in AI Gov. Fellowship (2-month reading group for AI governance)
- Engaged in 6 3-hour open forums related to relevant AI safety topics in governance, regulation, and ethics
- Topics included alignment theory, time horizon/takeoff speeds, frontier AI regulation, model evaluations, compute monitoring, safety deployment strategies (e.g. Windfall Clause), and societal harms

Supervised Program for Alignment Research (SPAR), Stanford University   Jan 2023 – Mar 2023
AI Governance Researcher | Stanford, CA   Supervisor: Robi Rahman (Epoch, ex-Stanford HAI)
- Handpicked as one of 2 out of 25 applicants to partake in Stanford AI Alignment's SPAR: Public Policy project
- Analyzed historical AI metrics (parameter, compute, dataset) across 31 countries to verify regional forecasting trends and inform governance strategies

Good Futures Initiative (GFI), UC Berkeley   Dec 2022 – Jan 2023
AI Governance Intern | Berkeley, CA   Supervisor: Aris Richardson (RAND Corporation)
- Handpicked as one of 25 out of 40 applicants to partake in EA@Berkeley Group's GFI winter internship
- Performed literature review of auditing policies across 6 industries (hardware, software, robotics, cybersecurity, pharmaceutical, and financial) with goal of establishing precedents for AI-specific auditing frameworks

EXTRACURRICULAR EXPERIENCE

BUILD, University of Pennsylvania   May 2023 – Aug 2023
AI Project Mentor/TA | Philadelphia, PA   Supervisor: Prof. Robert Ghrist
- Supervised by Prof. Robert Ghrist and his new BUILD group, which seeks to do R&D involving generative AI
- Advised cohort of 20 undergrad AI product engineers, each pursuing their own product/research development tracks

Science and Technology Wing (STWing), University of Pennsylvania   Jan 2016 – May 2021
Marketing Officer (Radar) & General Member | Philadelphia, PA
- Assisted with marketing efforts for the STWing residential program, which is committed to providing a synergetic learning community for STEM and STEM-adjacent undergraduates

VOLUNTEER EXPERIENCE

Gender & Sexuality Student Services (GSSS), University of Illinois Springfield   Dec 2022 – Present
Advocate and Member | Springfield, IL
- Supported diversity, equity, and inclusion efforts at University of Illinois Springfield
- Offered feedback on LGBTQ+ workshops to help improve school-wide education and advocacy efforts

Gender and Sexuality Alliance (GSA), Foothill College   Mar 2022 – Dec 2022
Student Mentor | Los Altos Hills, CA
- Supported diversity, equity, and inclusion efforts at Foothill College
- Mentored other LGBTQ+ members about life and work experiences, especially experiences related to navigating STEM field

Lambda Alliance, University of Pennsylvania   Jan 2019 – May 2020
Volunteer Member | Philadelphia, PA
- Served as liaison between Lambda Alliance (umbrella organization) and Penn Non-Cis club
- Assisted with meeting setups, event promotion, and general community building efforts for all Lambda-affiliated groups

PUBLICATIONS AND PRESENTATIONS

Publications & Submissions
- (Legal Text) Infohazards and Privacy Risk from LLMs | JTC 21, EU Parliament   (Pending Review) Aug 2023
- (Article) Trends in landmark machine learning model training | Stanford AI Index   (Pending Review) Mar 2023
- (Article) Survey review of AI-adjacent audit regulations | UC Berkeley GFI Showcase   Jan 2023
- (Paper) A diagnostic methodology for Alzheimer's disease | Journal of Clinical Bioinformatics   Aug 2013

Works in Progress
- (Legal Text) Informational risk management systems for LLMs   (Expected) May 2024
- (Article) Trends in landmark machine learning model training (follow-up)   (Expected) May 2024
- (Paper) Technical evaluations for PDE and ODE loss-functions in PINNs   (Expected) Feb 2024
- (Poster) PINNs approaches to simulation solutions of differential equations   (Expected) Dec 2024

Research Presentations
- University of Illinois Springfield: Spring 2024 Mathematics Colloquium   (Upcoming) Apr 2024
- University of Illinois Springfield: Student Technology, Arts, & Research Symposium (STARS) 2024   (Upcoming) Apr 2024
- University of Pennsylvania: BUILD Summer Summit 2023   Aug 2023
- Stanford University: Stanford AI Alignment (SAIA) Research Symposium 2023   Mar 2023
- University of California Berkeley: Berkeley Good Futures Initiative (GFI) Research Symposium 2023   Jan 2023

Conferences / Workshops
- EAG Bay Area 2024   (Expected) Feb 2024
- UC Berkeley CLTC: NIST Second Draft Framework Review Workshop (invite only)   Aug 2023
- UC Berkeley CLTC: NIST First Draft Framework Review Workshop (invite only)   May 2023
- EAG Bay Area 2023   Feb 2023
- AI Alignment Retreat 2022 (AIR)   Dec 2022
- EAGx Berkeley 2022   Dec 2022

AWARDS AND HONORS

Business Innovation Challenge 2022, 2nd Place Award   2022
Foothill College | Los Altos Hills, CA   Presenter: Mr. Laurence Lew
- $500 social innovation prize for prototyping ML-powered loan eligibility predictor to help students quickly gauge loan success rates with government, non-profit, and for-profit financial aid sources

John C. Parker Fellowship for Undergraduate Research, Recipient for 2016   2016
University of Pennsylvania | Philadelphia, PA   Presenter: Dr. Krimo Bokreta
- $500 undergraduate research grant for statistical research about game theory states for board games and redesigned custom board game prototype implementing statistical design principles

SELECTED PROJECTS

FDA Food Violation Score Predictor | Source   Dec 2023
Python: Matplotlib, Numpy, Pandas | Scikit-Learn, NLTK | Streamlit
- Developed a logistic regression model to predict FDA food safety noncompliance for restaurants (0.98 testing precision).

Academic Research Visualization App | Source   Sep 2023
Python: Matplotlib, Numpy, Pandas | NLTK, Textblob, genism, NetworkX | Streamlit
- Developed a full-stack, locally-deployed Python app to visualize academic paper meta-data
- Used by the Department of Defense to monitor academia and inform their own research direction, budget, and policy

Deepfake Image Classifier App | Source   May 2023
Python: Matplotlib, Numpy, Pandas | Tensorflow: Keras | Streamlit
- Developed an EfficientNetv2 convolutional neural net to detect deepfakes (0.99 validation precision)

Poisonous Mushroom Identifier Full-Stack App | Source   Mar 2022
Python: Matplotlib, Numpy, Pandas, Seaborn, Flask, SQLAlchemy | Tensorflow: Keras | SQL | HTML/CSS/JS
- Developed a full-stack web-app that applies RF, SVM, LogReg to detect poisonous mushrooms (0.99 validation accuracy)

SKILLS AND FLUENCIES

Core Competencies
- **Coding Languages**:   Python (OOP & Functional) | APIs | Git, GitHub, GitBash | Unix, Shell
- **ML & Computation**:   Scikit-Learn, Keras, Tensorflow | NLTK, Textblob, genism, NetworkX
- **Analytics/Visualization**:   Pandas, Numpy, Matplotlib, Seaborn | Tableau | Excel/VBA
- **Database, Cloud, DevOps**:   SQL | Streamlit | Streamlit Community
- **Domains:**   Back-end Engineering | NLP | Classification | Technology Policy and Law

Auxiliary Competencies
- **Coding Languages**:   C/C++ | HTML/CSS/JS
- **ML & Computation:**   Pytorch | SciPy, Statsmodel
- **Database, Cloud, DevOps**:   NoSQL | PyMongo | Apache Hadoop/Spark | AWS | Flask, SQLAlchemy
- **Domains:**   Full-stack Engineering | Forecasting | Computer Vision | GenAI/LLMs

REFERENCES

Given the untraditional breadth of my experiences, I can better represent myself with references beyond the 1-reference-limit asked by the NSF REU application. The recommenders listed here have all agreed to provide a recommendation letter/reference for me to the NSF REU 2024 application.

Prof. Liang Kong | Springfield, IL | +1 (217) 206-7219 | lkong9@uis.edu
Associate Professor of Mathematics
University of Illinois Springfield (UIS)
- Principal investigator (PI) to my mathematics/CS research at the Kong Research Group
- Direct supervisor for UIS's Directed Research/Reading Program in mathematics
- Field supervisor for the IPL 301: Project in Mathematics "independent study course" taken at UIS
- Professor for the Operations Research Method course taken at UIS

Prof. Hei-Chi Chan | Springfield, IL | +1 (217) 206-7331 | hchan1@uis.edu
Department Chair & Associate Professor of Mathematics
University of Illinois Springfield (UIS)
- Direct academic/major advisor for mathematics degree at UIS
- Co-supervisor for UIS's Directed Research/Reading Program in mathematics
- UIS supervisor for the IPL 301: Project in Mathematics "independent study course" taken at UIS
- Professor for the Topics in Math: Mathematics & Framework Behind GPT course taken at UIS

Dr. Gregory Forcherio | Crane, IN | +1 (812) 381-4389 | gregory.t.forcherio.civ@us.navy.mil
Nanophotonic Research Scientist
Naval Surface Warfare Center: Crane (NSWC Crane), United States Department of Defense
- Direct supervisor to my data science work as an NSIN Fellow at the Department of Defense
- Direct supervisor to my data science work at the NSWC Crane
- Field supervisor for the IPL 300: Internship in Mathematics course taken at UIS

Dr. Koen Holtman | Eindhoven, Netherlands | +31 (62) 9204572 | k.holtman@chello.nl
Dutch Representative & EU AI Act Standards Contributor
CEN-CENELEC JTC 21 (Technical Standards Committee), European Parliament
- Direct supervisor to my AI standards contributor work at AISC 8
- Project advisor to my senior AI standards contributor work at AI Standards Lab