

# KHAKNAZAR (HAKI) SHYNTASSOV

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## Education

**BS in Electrical and Computer Engineering, *cum laude***  
Lafayette College

**May 2023**

## Research Interests

- Computational modeling of cognitive and learning processes
- Machine learning for biomedical and behavioral data analysis
- Multimodal signal processing and data fusion
- Computer vision and eye-tracking analysis
- Neurophysiological signal acquisition and processing
- Embedded and human-centered computing for biomedical applications

## Research Experience

### Research Assistant

**March 2021 – Present**

*Department of Electrical and Computer Engineering, Department of Neuroscience, Lafayette College*

- Developed a performance-scoring algorithm to quantify task performance of study participants by comparing paths to ground-truth trajectories in a virtual Hebb–Williams maze game.
- Designed and evaluated machine-learning models to classify typical and atypical learning development using performance scores and demographic features.
- Implemented signal-processing pipelines to synchronize eye-tracking data with maze navigation logs and extract saccadic events associated with decision-making errors.
- Identified a strong correlation of saccadic events with participants' erroneous decisions during maze-solving.
- Deployed the classification framework within a web-based maze game for early dyslexia screening in children, achieving ~80% balanced classification accuracy.
- Used Java, Python, and MATLAB for algorithm development, data processing, and model evaluation.

### Individual Research

**June 2020 – April 2021**

*Department of Electrical and Computer Engineering, Lafayette College*

- Developed a computer-based indoor firefighting detection system using a machine-learning-based fire classification model.
- Designed a stereo-vision algorithm to estimate fire geolocation using distance and angular measurements from dual cameras.
- Implemented a Python-based control application enabling autonomous drone navigation toward detected fire sources and proposed an infrared-based verification algorithm. Achieved 2 mins and 20 secs response time.
- Presented this research at Lehigh University's David and Lorraine Freed Undergraduate Research Symposium.

## Publications

### 56th Annual Conference on Information Sciences and Systems (March 2022)

Yu, Y.-C., Shyntassov, K., Zewge, A., & Gabel, L. (2022).

Classification predictive modeling of dyslexia. *Proceedings of the 56th Annual Conference on Information Sciences and Systems (CISS)*, Princeton, NJ, USA, 177–181.

<https://doi.org/10.1109/CISS53076.2022.9751182>

## Karger journal publication (October 2022)

Gabel, L., Battison, A., Truong, D., Lindström, E., Voss, K., Yu, Y.-C., Roongruengratanakul, S., **Shyntassov, K.**, Riebesell, S., Toumanios, N., Nielsen, C., Paniagua, S., & Gruen, J. (2022).

Orthographic depth may influence the degree of severity of maze learning performance in children at risk for reading disorder. *Developmental Neuroscience*, 43(3).

<https://doi.org/10.1159/000527480>

## IEEE International Symposium on Biomedical Imaging (Athens, May 2024)

Yu, Y.-C., **Shyntassov, H.**, Kaushik, P., & Gabel, L. (2024).

Saccade detection in virtual gaming for dyslexia classification. *Proceedings of the IEEE International Symposium on Biomedical Imaging (ISBI)*, Athens, Greece.

<https://doi.org/10.1109/ISBI56570.2024.10635745>

## Conference Presentations

Yu Y-C, **Shyntassov K**, Kaushik P, Gabel LA (2024). *Saccadic Detection in Virtual Gaming for Dyslexia Classification in Children*. Presented at the Society for Neuroscience meeting, Chicago, IL.

Yu Y-C, **Shyntassov K**, Zewge A, Gabel LA (2023). *Classification Predictive Modeling of Dyslexia*. Presented at the Society for Neuroscience meeting, Washington, DC.

Gabel LA, Battison A, Truong DT, Lindström ER, Voss K, Yu Y-C, Roongruengratanakul S, **Shyntassov K**, Riebesell S, Toumanios N, Nielsen-Pheiffer C, Paniagua S, Gruen, JR (2022, Nov) *Orthographic depth may influence the degree of severity of maze learning performance in children at risk for reading disorder*. Presented at the Society for Neuroscience meeting, San Diego, CA.

## Professional Experience

### Associate Software Engineer

**July 2023 - December 2025**

*SEI Investments*

- Built and maintained production Python applications for automated data extraction and financial-statement processing, including requirement gathering, modular design, testing, and deployment with DevOps.
- Led Matomo web-analytics integrations and implemented GDPR-compliant consent and anonymization logic (IP, geolocation, usernames, visit history).
- Designed and automated ETL workflows in Alteryx to clean, transform, and streamline financial data for analysts and reporting teams.
- Contributed to a strategic AI project to aggregate multi-source financial data and generate automated executive-level client reports.

### Automation Engineering Intern

**June 2021 – August 2021**

*Sanofi Pasteur*

- Designed and implemented Human-Machine Interfaces for Central Utility Plant's chiller and boiler ventilation systems and a greywater system (FactoryTalk View Studio, Logix Designer).
- Fixed freezer analog cards to ensure proper operation of electronic data capture system (PLC programming, Logix Designer).
- Managed a database (FactoryTalk Historian ME) of Programmable Logic Controller program's tags for Central Utility Plant.
- Wrote User Requirement Specification, Functional Requirement Specification, and Detail Design Specification documentation.

## **College Service**

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### **Project Assistant**

*Digital Scholarship Services, Lafayette College*

**September 2019 – May 2021**

- Digitized, audited and performed visual modification to print and audio primary materials from the library's special collections and archives.
- Improve user accessibility by creating captions to video and audio interviews related to Black Bethlehem Oral Histories project.

## **Projects**

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### **PennApps XXI Hackathon, University of Pennsylvania**

**September 2020**

*Best Use of Google Cloud: COVID-19 Hackathon Fund Winner*

- Using Google Cloud API and Google Maps decoder, developed an intuitive donation platform where citizens can quickly find hospitals in need of donations and help ensure hospitals maintain an adequate number of supplies and equipment.
- Primarily worked on retrieving information from databases and designed an algorithm that ranks each hospital according to the degree of need in PPEs (Python, Google Cloud API).
- Developed an interactive map that shows each hospital's location, rank and data about available beds and PPEs (Python, Folium).

## **Professional Memberships**

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IEEE - Eta Kappa Nu

## **Technical Skills**

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Python; Alteryx; Matomo; CI/CD; Java; MATLAB; SQL; R; HTML; CSS; SketchUp; AutoCAD; Mathematica; Simulink; MS Access, Excel, Word, PowerPoint, Publisher; Adobe Photoshop, Illustrator, InDesign.

## **Languages**

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English, Russian, Kazakh