

# Brian K. Johnson

## Data Scientist

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github.com/brianjohnson555 | US citizen able to obtain security clearance

### SUMMARY

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I'm a highly motivated data scientist with international experience applying machine learning and analytical tools to solve complex problems across industry, academia, and government domains. My previous work has been published in top scientific journals and presented at international conferences.

### EXPERIENCE

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#### Research Scientist

Nov 2022 – Nov 2024

*Max Planck Institute for Intelligent Systems*

*Stuttgart, Germany*

- Managed research team of 5 members using Agile methods to advance state-of-the-art research in computer vision/self-attention-based haptic robotic systems.
- Created a zero-shot visual saliency algorithm using DINO (vision transformer) and ResNet-based models.
- Trained LSTM model in PyTorch for time series forecasting of a voltage sensor at 20 kHz sample rate.
- Organized and chaired multi-day scientific conference with 30+ presenters.

#### NSF Graduate Researcher

Aug 2018 – Aug 2022

*Advanced Medical Technologies Laboratory*

*Boulder, CO*

- Implemented distributed, real-time (200 Hz) predictive control of a robotic system by leveraging nonlinear mathematical modeling, sensor fusion, and Kalman filtering.
- Designed a multi-agent gradient descent algorithm applying OpenCV for object detection/manipulation tasks.
- Secured research funding totaling \$150k through grant proposal writing.
- Published work in top scientific journal achieving 12k accesses and 98th percentile article popularity.

#### Research and Development Intern

June 2017 – Aug 2018

*Sandia National Laboratories*

*Albuquerque, NM*

- Applied principal component analysis (PCA) on multimodal data to measure vibration safety margins.
- Developed algorithm demonstrating harmonic noise reduction up to 90% on test data using matrix-inverse and Laplace, Z-transform methods.

### PROJECTS

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#### Text simplification for online Chinese content

*(ML, NLP, LM, ETL)*

- Developed end-to-end lexical simplification pipeline using NER, POS tagging, and embedding similarity to increase text readability of HTML pages for Chinese language learners.
- Fine-tuned generative BART model for summarization via hyperparameter optimization using 500k sentence pairs from People's Daily Corpus, achieving SARI simplification score of 34.9, close to state of the art.

#### Automated job/resume matching service

*(Web scraping, ETL, NLP)*

- Created multi-threaded ETL pipeline to scrape job data from the web using BeautifulSoup, requests, and rotating proxies. Applied hybrid search combining fastText and TF-IDF to match jobs to resumes.
- Deployed an automated workflow with AWS Lambda to regularly scrape data and output job recommendations to increase job search effectiveness and speed.

### SKILLS

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**Languages:** Python, C++, HTML, Julia, SQL

**Platforms:** AWS cloud, MATLAB, Jupyter, Linux, git, github, LaTeX

**Packages:** PyTorch, Pandas, scikit-learn, TensorFlow, NLTK, OpenCV, matplotlib, seaborn

## EDUCATION

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<b>Ph.D. Mechanical Engineering</b> , University of Colorado Boulder	<b>2022</b>
<b>M.S. Mechanical Engineering</b> , University of Colorado Boulder	<b>2020</b>
<b>B.S. Mechanical Engineering</b> , Cornell University, <i>summa cum laude</i>	<b>2017</b>

## PUBLICATION HIGHLIGHTS

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- B.K. Johnson**, J.S. Humbert, M.E. Rentschler, "A gradient descent approach for velocity control and object manipulation on shape displays," *under review*.
- B.K. Johnson\***, M. Naris\*, et al., "A multifunctional soft robotic shape display with high-speed actuation, sensing, and control," *Nature Communications* **14**, 4516. (2023)
- V. Sundaram\*, K. Ly\*, **B.K. Johnson**, et al., "Embedded magnetic sensing for feedback control of soft HASEL actuators," *IEEE Transactions on Robotics* **39**, 808-822. (2022)
- B.K. Johnson**, et al., "Identification and control of a nonlinear soft actuator and sensor system," *IEEE Robotics and Automation Letters* **5**, 3783-3790. (2020)
- B. Johnson**, J.S. Cap, "Removal of stationary sinusoidal noise from random vibration signals," *Sandia National Lab*, SAND-2018-1900. (2018)

\*equal contribution

## AWARDS

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Beverly Sears Graduate Research Grant	<b>2022</b>
National Science Foundation Graduate Research Fellowship <i>National Science Foundation</i>	<b>2019</b>
National Defense Science and Engineering Graduate Fellowship <i>Alternate Awardee; Department of Defense</i>	<b>2019</b>
Dean's Graduate Innovation Assistantship <i>College of Engineering, University of Colorado Boulder</i>	<b>2018</b>

## PERSONAL INTERESTS

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Aviation (Private Pilot) | Chinese language | Piano | Photography | Science fiction