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SUMMARY

• Ph.D. research scientist with 5+ years of experience in interdisciplinary teams from NASA and Saudi Aramco for material characterization and statistical analysis, track record of scientific accomplishment with 12 publications.
• 4+ years of full-stack Java experience in computer vision, web, and mobile development with solid programming skills and computer science knowledge.

EDUCATION

Rice University, Houston, TX
Ph.D. in Chemical and Biomolecular Engineering, GPA 3.63/4.00 Research Advisor: Prof. Matteo Pasquali
Purdue University, West Lafayette, IN
BSE with honor degree in Chemical Engineering, GPA 3.76/4.00 Research Advisor: Prof. Alex Wei

WORK EXPERIENCES

Rice University Complex Flow and Complex Fluids Lab Houston, TX
LabSup: Spring and Hibernate based Lab supplies management system (github.com/zt5rice/hermes)

- Built a web application based on **Spring MVC** to support item search and listing (dependency injection, inversion of control, REST API, etc.).
- Implemented security workflow via in-memory and **JDBC** authentication provided by **Spring Security**.
- Utilized **Hibernate** to provide better support for database operations.
- Developed a Spring Web Flow to support item ordering.

Machine learning assisted singled-walled carbon nanotube(SWCNT) Transport in silica pores.

- Led an optical team of 5 to design, build, and maintain a near-infrared (NIR) laser fluorescent optical system(microscopy and spectroscopy) to visualize **SWCNT** as an oil marker for extending crude oil mapping to smaller pores beyond current tracers' pore size limit.
- Estimated Hurst exponent, categorize anomalous diffusion type of SWCNT in complex pores, developing a convolutional deep neural-network model **(CNN)** in MoNet Architecture with more than 90% accuracy. Results will be presented at the AIChE annual meeting.

Super-resolution video tracker for fast-moving and flexible nanoparticles

- Developed automated **image processing** code to track multiple parameters for various complex nanoparticles, such as bending flexible nanorods and nano-sheets.
- Optimized MATLAB **video processing** code and leveraged parallel computing in the cluster, reducing **video processing time** from 15 hours to 30 minutes.
- **K nearest neighbors (KNN)** algorithm is applied and achieved flow visualization in 10 times smaller published rock pore system with 10 times stronger signal intensity. This software directly offers methods for 5 high-impact journal papers.

TECHNICAL SKILLS

- Programming language: Java, JavaScript, MATLAB, SQL, Python, C, Go, FORTRAN
- Web Development: Java Servlet, AngularJS, Node.js, HTML &CSS, React, Ant Design, Material-UI, Android
- Databases and Cloud: MySQL, AWS EC2, Google Cloud

PROJECTS

Job+: A Personalized Job Recommendation Engine (https://github.com/zt5rice/jobplus)

- Designed and implemented an interactive web app for users to search and apply for available positions.
- Performed front-end web UI design and implementation using **HTML/CSS/JavaScript**.
- Implemented RESTful APIs using Java servlets, retrieved job descriptions using GitHub API, and stored data in **MySQL**.
- Explored multiple recommendation algorithms and extracted keywords from job descriptions to implement a Content-based algorithm.

- Deployed the service to **AWS EC2**.

Smart Express: a web application providing drone and robot dispatch solution
(https://github.com/zt5rice/Dispatch-Delivery-Management-App)
- Designed and developed a full-stack web application for users to deliver packages using drones/robots, place an order, and track the delivery.
- Co-led an Agile team of 14 members in the development process and maintained the product document.
- Created a single-page web application using **React** and **Ant Design**, with **React Router** for page navigation, **React Redux** for global state management, and **Redux-Thunk** for Asynchronous operations.
- Built the Room Database with LiveData & ViewModel to support local cache and offline model.
- Collaborated with team members to perform unit-level testing and integrated frontend and backend.

Around: GCP and React-based Social Networks
- Launched a scalable web service in **Go** to handle user posts and deployed to **Google Cloud** (Google App Engine).
- Used **Elasticsearch** (deployed to GCE) to provide search functions such that users can search recent posts and list personal posts.
- Designed and implemented a social network web application with **React JS**.
- Implemented features for users to create and browse posts.
- Improved the authentication using token-based registration/login/logout flow with **React Router** v4 and server-side user authentication with **JWT**.

Twitch+: A Personalized Twitch Resources Recommendation Engine
- Designed and built a full-stack web application to search Twitch resources (stream/video/clip) and get recommendations.
- Built a web page with a rich + user-friendly experience using **React** and **Ant Design.**
- Implemented RESTful APIs using Java servlets, retrieved natural Twitch resources using Twitch API, and stored data in **MySQL**.
- Support login/logout and favorite collection.
- Explored multiple recommendation algorithms and extracted game information from Twitch resources to implement a Content-based algorithm.
- Deployed the service to **AWS EC2** for better stability.

TravelPlanner: A travel path management web application
- Built a full-stack web application for travelers to plan/customize and save travel paths from points of interest based on **Java Spring MVC** and **Google Maps** API.
- Collaborated with an interdisciplinary team of 9 members in the development process and maintained the product requirement document.
- Built a responsive web page using **React JavaScript** and **Material-UI**.
- Implemented RESTful APIs of controller, service, and dao using **Spring Boot**, retrieved map resources using **Google Map** API, and stored data in **AWS RDS MySQL**.
- Implemented features for users to generate, visualize, store, and share travel paths.
- Support login/logout and favorite attraction collection.
- Deployed the app to **AWS** for demonstration and supported 200 qps tested by **Apache JMeter**.

SELECTED PUBLICATIONS
- Adnan, M.; Pinnick, R. A.; **Tang, Z.**; Taylor, L. W.; Pamulapati, S. S.; Carfagni, G. R.; Pasquali, M. "*Bending Behavior of CNT Fibers and Their Scaling Laws*." Soft Matter 14 (41), 8284-8292.
- Smith, A. D.; **Tang, Z.**; Pasquali, M.; Martí, A. *"Real-Time Visualization and Dynamics of Boron Nitride Nanotubes Undergoing Brownian Motion*." The Journal of Physical Chemistry B 124 (20), 4185-4192.
- Umezaki,U.; Smith, A. D.; **Tang, Z**.; He,Z.M.S.; Corr,S.; Kolomeisky, A.; Pasquali, M. Martí, A. *"Two-Dimensional Diffusion of Hexagonal Boron Nitride Nanosheets in Aqueous Solution."* submitted to ACS nano.
- **Tang, Z.**; Eichmann, S.L.; Jamali, V.; MacKintosh, F. C.; Pasquali, M. *"Investigating Ergodicity-Broken Rotational Dynamics of SWCNT in Hexagonally Packed Colloidal Pores Via Machine Learning.*" AIChE Annual Meeting 2023 Orlando FL.