

## **Khalil Lezzaik**

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### **Education**

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#### **Ph.D. Water Resources and Remote Sensing**

University of Georgia, Athens, GA, USA | 08/2012 – 08/2016

- **Dissertation:** *An Integrated Assessment of Groundwater Scarcity and Risk Conditions in the Arab Middle East and North Africa Region*
- **Key Findings:**
  - Approximately 1.28 million km<sup>2</sup> of groundwater reserves are experiencing significant declines due to climatic drought conditions and unsustainable anthropogenic exploitation.
  - Governance structures and food security policies, rather than hydrological characteristics, are critical determinants of groundwater depletion risk.
- **Significance:**
  - Pioneered a methodological framework for assessing groundwater resources in data-scarce regions using ArcGIS modeling and advanced remote sensing datasets and tools.
  - Developed a multi-disciplinary regional screening tool to identify areas most susceptible to groundwater depletion, integrating physical, socioeconomic, and governance factors.

#### **M.S. Geological Engineering**

University of Leeds, Leeds, United Kingdom | 09/2009 – 09/2010

- **Dissertation:** *Deterministic and Probabilistic Controlled Water Risk Assessment of Trichlorofluoromethane Groundwater Contamination in Swansea, South Wales*
- **Key Findings:**
  - Conducted fate and transport modeling of Trichlorofluoromethane groundwater contamination, demonstrating that the contamination plume posed no risk to open waters in Swansea Bay.
- **Significance:**
  - Research findings prevented unnecessary remediation efforts, saving significant financial resources for public environmental agencies while ensuring effective environmental management.

#### **B.S. Geology**

American University of Beirut, Beirut, Lebanon | 10/2006 – 07/2009

**Dissertation:** *A 16 km<sup>2</sup> Geological Investigation and Mapping of the Western Mount Lebanon Chain.*

### **Professional Experience**

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**Office of Water Programs, California State University, Sacramento, CA, USA**

06/2018 – Present

*Staff Research Engineer II*  
Present

04/2023 –

- **Regulatory Compliance Expertise:** Successfully completed 27 Sewer System Management Plans (SSMPs) for California State Parks, ensuring compliance with state and federal regulations.
- **GIS and Data Analytics:** Leveraged GIS Technology and geographic data to support decision-making, optimize project planning, and improve environmental and engineering assessments for California State Agencies.
- **Environmental Policy Analysis:** Conducted in-depth research and analysis of environmental regulations, ensuring adherence to environmental standards for California State Parks.
- **Innovative Environmental Solutions:** Designed and implemented advanced environmental monitoring tools using Arduino microcontrollers to collect and analyze critical environmental data.
- **Effective Communication and Training:** Produced engaging training videos and outreach materials, simplifying complex stormwater and environmental concepts for State Parks staff and public audiences.

*Staff Research Engineer I*  
04/2023

06/2018 –

- **Water Quality Expertise:** Delivered technical expertise and applied research services in water quality monitoring and evaluation, stormwater permitting, best management practices (BMPs), and water and wastewater treatment.
- **Regulatory Compliance Support:** Provided technical and managerial assistance for environmental regulation and compliance initiatives at the California Department of Parks and Recreation.
- **Data Analysis Proficiency:** Conducted data collection, analysis, and interpretation using statistical software, GIS, and remote sensing technology to support informed decision-making.

### **E-International Relations Website**

*Deputy Editor*  
04/2019

10/2018 –

- **Editorial Expertise:** Edited, formatted, and published unsolicited submissions and commissioned articles by leading experts in international politics, international relations, and political economy.
- **E-Book Publications:** Provided editorial assistance for notable publications, including:
  - *Regional Security in the Middle East: Sectors, Variables, and Issues* by Bettina Kock and Yannis A Stivactis (ISBN: 978-910814-51-2)
  - *International Relations* edited by Stephen McGlinchy (ISBN: 978-910814-18-5)

*Associate Articles Editor*

10/2018 – 04/2019

**Editorial Expertise:** Edited, formatted, and published unsolicited submissions and commissioned articles by leading experts in international politics, international relations, and political economy as Associate Articles Editor.

*Environment/Green Politics Editor*

12/2017 – 10/2018

**Editorial Commission:** Commissioned, edited, and published articles, blogposts, and interviews by leading experts on environmental and green politics on the intersection of 21<sup>st</sup> international relations with environmental issues and challenges.

**Water Resources and Remote Sensing Laboratory, Athens, GA, USA**

08/2012 – 08/2016

*Researcher*

**Hydrological Research Expertise:** Planned, designed, and executed independent hydrogeological research projects, including data collection, reduction, analysis, and interpretation. Supported multiple lab research projects while performing supervisory, training, and editorial duties.

**Responsibilities:**

- Conducting literature review and background studies
- Collecting, managing, analyzing hydrological and socio-economic data
- Summarizing research output in scientific articles and white reports
- Visualizing, communicating, and presenting research at inter-(national) conferences.

**Achievements:**

- ✓ Developed Groundwater Risk Index (GRI) designed to evaluate groundwater depletion risk and its causal mechanisms, as a function of physical (e.g., groundwater reserves) and socioeconomic (e.g. governance, food security) criteria
- ✓ Modeled regional groundwater reserves and storage changes in the Middle East and North Africa region, using a quantitative ArcGIS model parameterized with global remote sensing datasets
- ✓ Quantified global groundwater depletion using gravimetric remote sensing data and hotspot statistical analysis

**University of Georgia, Athens, GA, USA**

08/2012 – 08/2016

*Teaching Assistant*

**Teaching Support:** Assisted lead faculty in performing teaching-related duties including class instruction, exam proctoring, test and assignment grading, record keeping, and student advising.

**Responsibilities:**

- Reinforcing teaching and knowledge transformation by reviewing material with students in small group or one-on-one
- Preparing teaching materials, setting up equipment, and organizing lab experiments
- Delivering Lectures
- Creating, writing, and preparing class material (syllabi, visual aids, presentations, supplementary notes, e-learning content).

**Achievements:**

- ✓ Taught geoscience and hydrogeology courses at undergraduate and graduate levels

- ✓ Provided instruction in advanced hydrology courses to graduate majors
- ✓ Assumed responsibility as a substitute lecturer when required
- ✓ Awarded the Outstanding Teaching Assistant Award for 2016-2017 by the University of Georgia's Geology Department and Graduate School.

### Relevant Internships

**Modern Engineering and Construction Company**, Beirut, Lebanon 04/2011 – 07/2011

#### *Engineering Intern*

- Provided administrative and managerial assistance on construction engineering projects for a wide array of service sector customers (e.g. banks, hotels).

### Teaching Experience

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**University of Georgia**, Athens, GA, USA

#### *Teaching Assistant*

- GEOL 4220/6220: Hydrogeology (~35 students/class) 2012 – 2016
- GEOL 1121L: Earth Processes and Environments (~18 students/class) 2013 – 2016
- GEOL 1120: Environmental Geoscience (~90 students/class) 2015
- GEOL 1250: Physical Geology (~90 students/class) 2015

#### Short Courses & Workshops

- Introduction to ArcGIS 2012 – 2016
- Advancing Research & Capacity in Hydrologic Education and Science 2013

### Certifications

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**Certified Drone Pilot License**, Federal Aviation Administration 01/2023  
**The Complete Python Programmer Bootcamp** (via Udemy.com) 02/2020  
**The Complete SQL Bootcamp** (via Udemy.com) 10/2019  
**Financing for Development**, World Bank (Certificate via Coursera.org) 12/2015  
**Water Supply and Sanitation Policy**, University of Manchester 07/2014

### Workshops

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**NASA/World Bank Workshop**, Washington D.C., USA 09/2015

**Title:** *Evapotranspiration Mapping for Water Security*

Topics:

- Approaches for developing evapotranspiration datasets and maps
- Evapotranspiration monitoring in USA, China, Brazil, and numerous developing countries
- Evapotranspiration monitoring and its role in improved water management, project planning, and food production

**British Petroleum Short Course**, Beirut, Lebanon 06/2011

**Title:** *Applied Deepwater Petroleum Exploration of the Levant Region*

Topics:

- Origins and geological requirements of hydrocarbons formation and accumulation
- Methods and tools used in hydrocarbon exploration, processing, and interpretation
- Project economics and environmental issues

## **Awards & Honors**

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### **2016**

Outstanding Teaching Assistant Award, Center for Teaching and Learning, University of Georgia

### **2015**

Miriam Watts-Wheeler Research Support, Department of Geology, University of Georgia

### **2014**

- Student Travel Grant, Geological Society of America
- Miriam Watts-Wheeler Travel Support, Department of Geology, University of Georgia
- Foreign Travel Assistance Program, Graduate School, University of Georgia

## **Software Experience**

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- **Hydrologic Modeling Packages:** SWAT, HEC-HMS, Visual MODFLOW, RAM, CONSIM
- **GIS Packages:** ArcGIS 10.x, QGIS
- **Image Processing Packages:** ENVI
- **Statistical Software:** R, Python, Excel
- **Graphic Design Packages:** CorelDraw, GIMP 2
- **Programming:** R, Python, SQL

## **Languages**

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- English (Native)
- Arabic (Native)
- Spanish (Beginner)

## **Professional Societies**

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- Groundwater Resources Association, member 06/2022 – Present
- WateReuse, member 07/2022 – Present
- California Stormwater Quality Association, member 07/2018 – Present

## **Publications**

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- Porse, Erik, Jonathan Kaplan, Khalil Lezzaik, David Babchanik, and Patrick Maloney. “Quantifying Replacement Rates from Indoor and Outdoor Urban Water Conservation Incentives in California.” Manuscript submitted for publication.
- **Lezzaik, K.** and Milewski, A. (2020), Sensitivity Analysis of the Groundwater Risk Index in the Middle East and North Africa Region, In Publication.
- **Lezzaik, K.,** & Milewski, A. (2018). A quantitative assessment of groundwater resources in the Middle East and North Africa region. *Hydrogeology Journal*, 26(1), 251-266. <https://doi.org/10.1007/s10040-017-1646-5>
- **Lezzaik, K.,** Milewski, A., & Mullen, J. (2018). The groundwater risk index: Development and application in the Middle East and North Africa region. *Science of The Total Environment*, 628–629, 1149–1164. <https://doi.org/10.1016/j.scitotenv.2018.02.066>

### Conference Proceedings

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- **Lezzaik, K.,** and Milewski, A. (2015), A Quantitative Assessment of Groundwater resources in the Middle East and North Africa Region, paper presented at AGU Fall Meeting Abstracts.
- **Lezzaik, K.,** and Milewski, A. (2014), A Global Hot Spot Analysis (Getis-Ord Gi\*) of Groundwater Storage Change Using Grace Satellite and GIS-Based Spatial Statistical Analysis, paper presented at 2014 GSA Annual Meeting in Vancouver, British Columbia.
- Milewski, A., El Kadiri, R., Durham, M., **Lezzaik, K.,** Cahalan, M., and Wondwosen, S. (2014), Evaluation of Groundwater Resources and Anthropogenic Impacts in Morocco Using Satellite-Based Observations, Hydrologic Models, and Radar Interferometry, paper presented at 2014 IAH Annual Meeting in Marrakech, Morocco.
- **Lezzaik, K.,** and Milewski, A. (2013), GRACE-Based Analysis of Total Water Storage Trends and Groundwater Fluctuations in the North-Western Sahara Aquifer System (NWSAS) and Tindouf Aquifer in Northwest Africa, paper presented at AGU Fall Meeting Abstracts.

### Service

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- Manuscript reviewer for Journal of Arid Environments 2016 – 2017
- Conference sessions moderated: Georgia Water Resources Annual Meetings 2013 – 2015

### Media Coverage

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- [Publication](#) featured by the [Arab Scientific Community Organization](#)