

# Rahmi Orhon Pak, Ph.D, Engineer & Scientist

+90-538-340-6612 (Turkey) | rahmi@orhonpak.com | www.rahmiorhonpak.com

## INTENT OF APPLICATION

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- Finding a new international position (researching and teaching) in natural sciences and engineering.
- Continuing my professional career in electronics, applied mathematics, and applied physical chemistry.
- Making a new start in completely new subject areas within; mathematics (pure or applied), physics (theory or experimental), chemistry (inorganic or biochemistry), and biology (cell laboratory or fieldwork collection).

## ENGINEER & SCIENTIST

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Dr. Rahmi Orhon Pak is an Engineer and Scientist with 15+ years of experience in research and development. He is a subject matter expert in optical-nuclear sensor technologies, electronic-magnetic materials, computer software and hardware components.

His work has direct applications in the energy arena (such as nuclear power, solar cells), for computer vision and ranging, in nuclear/x-ray astrophysics, in optical/electronic communications, in biomedical imaging and medical diagnostics, and is featured within the emerging field of new 'quantum' / 'neural' computers.

He holds a very high level of interest in manufacturing of semiconductor devices, batteries, solar cells, sensors and other electrical components, microcontrollers, model-based development of mixed-signal electronic circuits and software for imaging, diagnostics, instrumentation and control systems for scientific applications.

## WORKING & LEADING

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***Pak Consulting, Science & Technology, Commercial Business***

**November 2020 – Present.**

*Owner Consultant*

*Istanbul, Turkey*

- I am currently solving problems related to neighbor relations, legal issues, ownership, repairs and renovation of my home. (2024)

Professionally: I am looking for work on the following subjects:

- 1) Real scientific, engineering, and technical (tech) work in Europe.
- 2) Advertising and e-trading for companies in Turkey and Europe.
- 3) Real estate property management, sales in Turkey and Europe.
- 4) Tailoring, clothes, textiles and fashion in Europe.

- Personal website: [www.rahmiorhonpak.com](http://www.rahmiorhonpak.com)

***Instrumentation Research & Development Engineer, Dept. of Physics***

**November 2019 – February 2020**

*Indiana University – Purdue University, Indianapolis (IUPUI)*

*Indianapolis, IN, USA*

- IUPUI is a public research university in Indianapolis, IN, with high research activity in medicine, biophysics, biochemistry, biology, biomedical and transportation engineering technologies.
- Responsible for the general safety and operation of workers in biophysics and optical research laboratories.
- Pioneering new instrumentation engineering for applications such as NMR, EPR/ESR, optical, and mechanical measurements.

***Pak Consulting, Science & Technology, Commercial Business***

**September 2018 – November 2019**

*Owner Consultant*

*Chicago, IL, USA*

- Personal connections for electronics applications in different industrial sectors: Semiconductor, Energy (Power), Mechatronics, Communications, Medicine, and many other major subject matter related to sensors & systems design, standard operations-experiments and statistical analysis of defects.
- Technical presentations to Fortune-500 companies and government research organizations at locations in USA.

***Electrical Engineer (Postdoc. Res. Scientist), Materials Science Division***

**September 2017 – September 2018**

*Argonne National Laboratory, UChicago-Argonne LLC*

*Lemont, IL, USA*

- Argonne National Laboratory (ANL) is a science and engineering research national laboratory operated by University of Chicago Argonne LLC for the U.S. Department of Energy.
- Performed basic scientific research on new engineering materials for next-gen. (quantum & memory) computers, medical imaging and environmental monitoring (optical UV-Visible-IR, x-ray/gamma-ray, neutron etc.) low-noise sensors.
- Model-based development of analog-digital electronics design.
- Electronics-hardware experiments for harsh environments (EMI, EMC, humidity, temperature, pressure etc.), writing of experimental test protocols and operation procedures, and instruction of product tester employees.
- Developed solutions and standards to problems in nuclear imaging, power, RF semiconductor components.
- Studies on spectrograms, filtering and adaptive machine-learning algorithms for error correction.

***Electrical Engineer (Quality and Safety Officer), Dept. of Electrical Engineering***

**June 2014 – December 2016**

*University of South Carolina*

*Columbia, SC, USA*

- University of South Carolina is a public research university in Columbia, SC, with high research activity in aerospace, marine, nuclear, medicine, semiconductors, robotics and Internet-of-Things (IoT) technologies.
- Responsible officer for the general safety of the workers in an electronics fabrication laboratory (at least \$2 million).
- Safety training and certification of lab personnel; management of an inventory of over 300 units of chemicals.
- Arrangement of quarterly inspections from Environmental Health and Safety officials.
- Ensured that the cleanroom fabrication, testing and characterization in the lab are up to standards.
- Decision-making and writing of emergency safety procedures, and Standard Operation Procedures.

***Electrical Engineer (Postgrad. Res. Scientist), Dept. of Electrical Engineering***

**August 2012 – August 2017**

*University of South Carolina*

*Columbia, SC, USA*

- Performed basic scientific research on new engineering materials for next-gen. solar cells and renewable energy, nuclear astrophysics, medical imaging, and environmental monitoring.
- Simulated and modeled electrical components for design software, hardware and production analysis.
- Optimized the work flow and process of new imaging components, reducing defects by automation.
- Electronics-hardware experiments for harsh environments (EMI, EMC, humidity, temperature, pressure etc.), writing of experimental test protocols and operation procedures, and instruction of product tester employees.
- Failure analysis of physical defects by optical and electron microscopy, SEM, EDS, EBIC, DLTS.
- Analyzed sensor data using embedded software ML algorithms, for precise actuator feedback control loops.
- Used power electronics for actuators such as AC/DC servo-motors, relays and for temp. or frequency control.
- Embedded software programs with C/C++, Java, Python, LabView, Matlab/Simulink.

**EDUCATION**

**Doctor of Philosophy (PhD) in Electrical Engineering**

*University of South Carolina*

GPA: 3.71/4.00

May 2013 - December 2016

*Columbia, SC, USA*

**Bachelor of Science (B.Sc.) in Electrical Engineering***University of South Carolina*GPA: 3.77/4.00 (**magna cum laude**)

August 2009 - May 2013

*Columbia, SC, USA***Diploma, High School, Mathematics & Sciences***Robert College*

September 2004 - June 2009

*Istanbul, Turkey***Certificates, Vocational***Enstitü İstanbul / İSMEK*

December 2023 - April 2024

*Istanbul, Turkey**"Laboratory Applications: Analysis of Grains" - Food Science and Technology**16 hours (2 days)**"Practical Preparation of Clothes Patterns and Models (Patternmaking, Modelist)"**72 hours (2.5 months)**- Fashion Design, Tailoring, and Textile Technology**"Real Estate Agency" - Property and Realty Management**120 hours (3 months)**"Advertising on Digital Media" - Sales, Marketing and Media Management**80 hours (2 months)***LANGUAGES**

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**Native Proficiency:** Turkish (Türkçe), English**Intermediate:** French (Français)**ACADEMIC HONORS & AWARDS**

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***Outstanding Research Assistant Award*** (out of 90 grad. students department-wide)**April 2015***Dept. of Electrical Engineering, University of South Carolina**Columbia, SC, USA****SPARC Graduate Research Fellowship*** (out of 200 select grad. students university-wide)**May 2014***Office of Vice President of Research, University of South Carolina**Columbia, SC, USA****Outstanding Senior Award*** (out of all graduating undergrad. students university-wide)**April 2013***Office of Student Life, University of South Carolina**Columbia, SC, USA****Magellan Undergraduate Research Fellowship*****May 2012***(out of 1000 select undergrad. students university-wide)**Office of Vice President of Research, University of South Carolina**Columbia, SC, USA****Friends of International Students Scholarship*****January 2012***(out of all international undergraduate and graduate students university-wide)**International Student Services, University of South Carolina**Columbia, SC, USA****Ranked in the 99<sup>th</sup> percentile of the National University Entrance Exam (2009), taken by over 1.35 million prospective students in Turkey.****(out of all candidates for university admission in Turkey, country-wide)**Issued by Council of Higher Education of the Turkish Republic (T.C. YÖK),***July 2009***Robert College**Istanbul, Turkey***12 technical research papers published – Nature, IEEE Transactions in Nuclear Science, SPIE Proceedings, ECS-Journal of Solid State Science and Technology.****Activities and associations:****Institute of Electrical and Electronics Engineers (IEEE), SPIE (International society for optics and photonics), Electrochemical Society (ECS), Eta Kappa Nu (HKN), Tau Beta Pi (TBP).****SOCIAL LEADERSHIP**

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***Student Advisory Board Member, Department of Electrical Engineering***

August 2010 - May 2013

*(Education)**Dept. of Electrical Engineering, University of South Carolina**Columbia, SC, USA****President, Eta Kappa Nu (HKN) IEEE Honor Society, Delta Phi Chapter***

August 2012 - May 2014

*(Science and Technology)**Office of Vice President of Research, University of South Carolina**Columbia, SC, USA*

**President of the Latin Dance Club of Robert College**

(Arts and Culture)

Robert College

September 2006 - June 2009

Istanbul, Turkey

**International Delegate, Editor-Journalist, Conference Organiser**

**European Youth Parliament (EYP)**

(Politics, Civic Rights and Liberties)

Robert College

September 2005 - June 2012

Istanbul, Turkey

## **BOOK PUBLICATIONS**

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1. **Rahmi O. Pak**, *Investigation Of Wide Bandgap Semiconductor Devices For Radiation Detection Applications*, University of South Carolina, Columbia, SC, USA, 2016.
2. **European Youth Parliament**, Committee on Civil Liberties, Justice and Home Affairs I, *Resolution Booklet of 56th International session (Autumn 2007)*, Dublin, Ireland, 2007.

## **JOURNAL PUBLICATIONS**

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1. Daniel G. Chica, Yihui He, Kyle M. McCall, Duck Young Chung, **Rahmi O. Pak**, Giancarlo Trimarchi, Zhifu Liu, Patrick M. DeLurgio, Bruce W. Wessels, and Mercouri G. Kanatzidis, "Direct Thermal Neutron Detection by the 2D Semiconductor  ${}^6\text{LiInP}_2\text{Se}_6$ ," *Nature*, 577, 346-349, 2020.
2. **Rahmi O. Pak** and Krishna C. Mandal, "Defect Levels in Nuclear Detector Grade  $\text{Cd}_{0.9}\text{Zn}_{0.1}\text{Te}$  Crystals," *ECS Journal of Solid State Science and Technology*, 5, P3037-P3040, 2016.
3. **Rahmi O. Pak**, Khai V. Nguyen, Cihan Oner, Mohammad A. Mannan, and Krishna C. Mandal, "Defect characterization of  $\text{Cd}_{0.9}\text{Zn}_{0.1}\text{Te}$  crystals using electron beam induced current (EBIC) imaging and thermally stimulated current (TSC) measurements," *SPIE Proc.*, 9593, 95931J1-1-95931J1-8, 2015.
4. **Rahmi O. Pak**, Khai V. Nguyen, Cihan Oner, Towhid Chowdhury, and Krishna C. Mandal, "Characterization of  $\text{Cd}_{0.9}\text{Zn}_{0.1}\text{Te}$  Single Crystals for Radiation Detectors," *IEEE Conf. Record*, R3A-39, 7 pages, 2015.
5. Cihan Oner, Towhid A. Chowdhury, **Rahmi O. Pak**, and Krishna C. Mandal, "Improved radiation detectors on 4H-SiC epilayers by edge termination," *SPIE Proc.*, 9968, 99680M-1-99680M-6, 2016.
6. Mohammad A. Mannan, Khai V. Nguyen, **Rahmi O. Pak**, Cihan Oner, and Krishna C. Mandal, "Deep Levels in n-Type 4H-Silicon Carbide Epitaxial Layers Investigated by Deep Level Transient Spectroscopy and Isochronal Annealing Studies," *IEEE Transactions on Nuclear Science*, 63, 1083-1090, 2016.
7. Mohammad A. Mannan, Khai V. Nguyen, **Rahmi Pak**, Cihan Oner, and Krishna C. Mandal, "Surface passivation and isochronal annealing studies on n-type 4H-SiC epitaxial layer," *SPIE Proc.* 9593, 95931H-195931H-11, 2015.
8. Khai V. Nguyen, **Rahmi O. Pak**, Cihan Oner, Mohammad A. Mannan, and Krishna C. Mandal, "High-barrier Schottky contact on n-type 4H-SiC epitaxial layer and studies of defect levels by deep level transient spectroscopy (DLTS)," *SPIE Proc.*, 9593, 95930I-195930I-8, 2015.
9. Cihan Oner, Khai V. Nguyen, **Rahmi O. Pak**, Mohammad A. Mannan, and Krishna C. Mandal, "Investigation of thermally evaporated high resistive B-doped amorphous selenium alloy films and metal contact studies," *SPIE Proc.*, 9593, 95931I-195931I-11, 2015.
10. Cihan Oner, Khai V. Nguyen, **Rahmi O. Pak**, Towhid Chowdhury, and Krishna C. Mandal, "Investigation of Metal Contacts on High-Resistivity Large-Area Amorphous Selenium Alloy Films," *IEEE 2015 Medical Imaging Conference, Nuclear Science Symposium on Room Temperature Semiconductor X- and Gamma-ray Detectors*, Oct. 31–Nov. 07, San Diego, California, *IEEE Conf. Record*, R3A-41, 6 pages, 2015.
11. Sandeep K. Chaudhuri, Khai Nguyen, **Rahmi O. Pak**, Liviu Matei, Vladimir Buliga, Michael Groza, Arnold Burger, and Krishna C. Mandal, "Large Area  $\text{Cd}_{0.9}\text{Zn}_{0.1}\text{Te}$  Pixelated Detector: Fabrication and Characterization," *IEEE Transactions on Nuclear Science*, 61, 793-798, 2014.
12. Krishna C. Mandal, Ramesh M. Krishna, **Rahmi O. Pak**, and Mohammad A. Mannan, "Characterization of high-resistivity CdTe and  $\text{Cd}_{0.9}\text{Zn}_{0.1}\text{Te}$  crystals grown by Bridgman method for radiation detector applications," *SPIE Proc.*, 9213, 92131L-1-9, 2014.