

Mohammad Samir Elassaad

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(408) 876 - 8502

FORMAL EDUCATION

California Polytechnic State University, San Luis Obispo

B.S. Materials Science & Engineering - Spring 2022

Sun West Aviation - San Luis Obispo County Regional Airport [KSBP]

Fully Licensed American Private Pilot, Single Engine Land - Spring 2022

Kenmore Air Harbor Inc - Seattle, Washington [S60]

Achieved Specialized Water Landing Rating, Single Engine Sea - Summer 2023

EXPERIENCE

Molten Salt Electrochemical Engineer - Kairos Power [Advanced Nuclear], Alameda, California

Fluoride Salt Chemistry Research & Development - Summer 2022 - Fall 2024

- Designed, fabricated, tested, and installed state of the art tech for the Largest FLiBe System in the WORLD ,*Engineering Test Unit 1.0 [14 Metric Tons Artificial Lava / Nuclear Coolant 650 °C flowing at 51 gps]*
 - Multiplexing system maintaining nanoamp precision across 13 meters for a variety of complex electrical and chemistry control equipment in unison, collaboration with Argonne National Lab
 - Assisted operations and physically modified systems while enclosure is hot and active
 - Conducted chemical archeology during decommissioning on sintered metal filters
 - Partially and fully submerged electrochemical sensors, ceramic materials compatibility
 - Level sensing system, *PRETU2 [400 kg FLiNaK 650 °C]*
- Created method to enable live 24/7 oxygen monitoring in molten fluorides up to 1050 ± 5 wppm
- Trained Beryllium Operator with 100+ hours using Powered Air Purifying Respirator and Tyvek Suits
- Full experimental sequencing, from concept to reality, to data processing and optimization

Kairos Power is a Forbes recognized most successful startup company developing molten salt nuclear reactors to enable the world's transition to clean energy, with the ultimate goal of dramatically improving people's quality of life while protecting the environment. Rapid iteration prototyping is ingrained in company culture.

Materials Science Laboratory Expertise - CP SLO, San Luis Obispo, California

Undergraduate Laboratory Operator & Scientist - Fall 2018 - Spring 2022

- Four years - Bakelite & Resin Metallography + Half Micron Super Polishing + Acid Etching + Microscopy + Computerized Analysis // Samples range from structural steel to advanced circuitry in microchips
- Four years - X-Ray Diffraction + Crystallographic Composition Data Interpretation
- Three years - Differential Scanning Calorimetry Identifying Glass Transition Temperatures
- Three years - Fourier-Transform Infrared Spectroscopy + Thermo-Gavimetric Analysis
- Two years - Scanning Electron Microscopy (Over 20+ hours machine operator)
- Two years - Fracture / Failure + Dynamic Mechanical Analysis
- Two year - Electrochemical Testing + Electrode / Cell Construction + Electrolyte Synthesis
- One Year - Micro / Nano Fabrication [Microchip Manufacture + Photolithography]

Customized Microchips [Nanotech] - CP SLO, San Luis Obispo, California

Micro / Nano Fabrication Site Operator - Winter 2021 - Spring 2022

After completing years worth of micro/nano fabrication studies and training, I embarked on a personal endeavor to design and fabricate my own custom made microchips. I utilized 100 mm boron doped p-type test grade single crystal silicon wafers as a base to grow a green 535 nm SiO₂ layer in a deionized H₂O humid furnace at 1,100 °C for 46 minutes and 53 seconds. A 40 % buffered hydrofluoric solution reduced the glass layer by 10 nm to a green / blue / purple color after a 16.7 second dunk etching at a rate of 0.6 nm per second. Piranha solution and spin rinse drying cleaned the wafers thoroughly between steps. Various combinations of metal alloys sputter coated the wafers including silver, titanium, aluminum, chromium, and nickel. I designed photomasks through draft sight and had them printed by a small laser processing facility on our coast. Negative photoresist was applied, hardened, light activated, and partially developed. Background metals were acid etched away clearly revealing the design pattern. The photoresist was fully developed and wafer rinsed to yield beautiful almost atomically perfect art pieces.

Carbon Nanotube Constructs [Nanotech] - CP SLO, San Luis Obispo, California

Bachelor of Science Senior Project - Fall 2021 - Spring 2022

The scope of this project tasked me to generate a unique method to deposit carbon nanotubes in a controlled and patterned manner onto the surface of a novel stainless steel cermet. My colleagues and I developed and tested several exotic forms of deposition. Success was encountered when metal substrates were chemically passivated to insulate a ferric matrix with chromium oxide, highlighting chromium carbide and nitride islands. The topographic and elemental boundaries between these surfaces provided electromagnetic field concentrators to guide semiconductive targets into place. For this reason, pristine single walled, chemical vapor deposition grown, metal particle terminated, carbon nanotubes were chosen. A doped acetone electrolyte connected a cell with cermet working and platinum counter electrodes. Polarizing the system was found to create electromagnetic fields where deposition becomes favorable. Applying various wave forms altered the geometry of surface coagulations, to enable custom structuring. This form of nano technology can assist the large scale industrialization of field effect transistors, x-ray emitters, confinement fusion efforts, etc.

Aircraft Engine Fracture Failure Analysis [Metallurgical] - CP SLO, San Luis Obispo, California

Component Inspector Final Project - Fall 2021

During my training phase, my flight instructor experienced an explosive engine failure 900 ft above ground level right after takeoff. She was able to safely land. After all the formalities passed, I was allowed to conduct my own investigation with university laboratories. The aircraft was a 1979 Cessna 152 N49681. The Lycoming O-235-N2C series engine was entirely dismantled, inspected, photographed, and archived. The internals were covered in shrapnel marks, as if a fragmentation grenade went off inside the piston chamber. Through optical and scanning electron microscopy, evidence of high friction wear and conductive remnant bronze particles were discovered on the piston connector rod interface, which had completely disengaged and collapsed. Later, blueprint documentation and airworthiness directives confirmed that the bronze bushing designed for mechanical lubrication was slightly out of tolerance. The 2,500 rpm high cycle environment pushed the bronze bushing out of place, resulting in massive and catastrophic structural failure.

Electrochemical Development Tester [Corrosion] - CP SLO, San Luis Obispo, California

Private Researcher - Summer 2021

In collusion with Dr. Ryan T. Smith, I conducted electrochemical testing for a unique and patented ultra hard steel alloy of various heat treatments and compositions. I cut raw samples utilizing low energy diamond blades. I spot welded chromel and constructed steel and platinum electrodes. I mixed and prepared sulfuric acid electrolytes of different molarities along with saturated potassium chloride reference solutions. I assembled electrolytic cells and operated standard electrochemical testing procedures mastering the Parstat 2273 potentiostat and its associated software. I plan to submit results to the National Institute of Standards & Technology as well as publish a scholarly journal report.

Tamahagane Steel Craftsmanship [Metallurgical] - Masahiro Tantoujou Forge, Kyoto, Japan

Apprentice Traditional Blacksmith - Fall 2019

I traveled to Japan to study under the last traditional master blacksmith in Kyoto, Yuya Nakanishi Masahiro. Through his guidance, I forged a short sword from Tamahagane Samurai Steel. This alloy, smelted in Shimane Prefecture, only 3 to 4 times a year, is incredibly rare and illegal to export in its raw form. I utilized traditional forging techniques including hammer + anvil, water / oil quenching, and differential heat treatment through ceramic fluid application. Temperature of the flame was gauged with eyesight only. Sharpening was done with wet stones to a razor edge. This was an extraordinary materials science opportunity.

Employed Laboratory Experience - CP SLO, San Luis Obispo, California

Laboratory Technician - Summer 2021

- Completed full chemical inventory of the entire Material Science & Engineering Department
- Decontaminated and reorganized fume hoods, chemical cabinets, and other work spaces
- Revised outdated and confusing standard operating procedures (Gold Sputter Coating)
- Performed regular laboratory maintenance and safety inspections

LEADERSHIP

Electrochemical Instructor for NACE - CP SLO, San Luis Obispo, California

Project Leader & Instructor - Fall 2021

I was inducted into the National Association of Corrosion Engineers [NACE] by the university club supervisor Dr. Ryan T. Smith for my expertise in electrochemical testing. I was the only student in the entire MATE department with practical qualified experience in this field to operate electrochemical laboratory equipment. I have trained students at this organization on the fundamentals of electrochemistry, electron flow, reference electrode utilization, electrode construction and preparation, electrolyte coalescence, potentiostat operation, and corrosion potential data analysis. It is an honor to share my knowledge with my peers, colleagues, and subordinates.

Junior Reserve Officer Training Corps - Viera High School, Melbourne, Florida

Cadet Command Sergeant Major - Fall 2015 - Spring 2018

Starting with no rank, I quickly learned to follow and distinguished myself as a prime candidate for future leadership positions (2015-2016). By my second year I had worked my way up to Sergeant First Class, in charge of my own squad of 12 cadets, teaching them everything from marching to first aid and land navigation. In addition to

this, I also earned the position of Bravo Raider Team Leader where I trained another separate 12 man squad of athletes to peak physical standards. I lead this team to victory at the Rockledge Regional Raider Meet beating our own Alpha team (2016-2017). My last year I had risen to the highest enlisted rank possible, Command Sergeant Major, and managed the training, fitness, and promotion/demotion program for 256 cadets at a Battalion level staff position (2017 - 2018).

AWARDS & HONORS

Congressional Medal of Merit

- *Awarded by* - Congressman Bill Posey - 2018

Medal of Outstanding Discipline & Leadership

- *Awarded by* - Army Lieutenant Colonel Timothy Thomas + Benevolent & Protective Order of Elks - 2018

Junior Reserve Officer Training Corps Awards

- Best Cadet of the Year Medal, 7x Distinct Ribbons, 4x Unique Arcs, Raider Chord, Battalion Staff Chord

CHARACTER REFERENCES

Mr. + Engineer III [REDACTED]

Mr. + Engineer III [REDACTED]

Ms. + Lead Engineer [REDACTED]

Mr. + Senior Manager + Copilot [REDACTED]

Dr. + Senior Engineer [REDACTED]

Dr. + Senior Engineer II [REDACTED]

Dr. + Lead Engineer II [REDACTED]

Dr. + Thermal Fluids Test [REDACTED]

Dr. + Reactor Instrument Controls [REDACTED]

Dr. + P.E. Director Molten Salt [REDACTED]

Dr. + Vice President Chemistry [REDACTED]

Dr. + Distinguished Engineer [REDACTED]

Dr. + Chief Nuclear Officer [REDACTED]

Dr. + Radiation Specialist [REDACTED]

Dr. + Metallurgical Professor [REDACTED]

Dr. + Quantum Professor [REDACTED]

Dr. + Microfabrication Professor [REDACTED]

US Army Lieutenant Colonel [REDACTED]

VALUABLE SKILLS

Quadrilingual

[Affinity for Communication]

- English, Arabic, Spanish, ASL
- Great at translating complex technical theories into simple practical ideas

Programming Skills

- Adept with MatLab, Solid Works
- Kitty Script HTML, Python, Others
- Years of experience with Excel, Power Point, and Word

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