Curriculum Vitae

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PROFESSIONAL SUMMARY

An ardent data science, materials and mining engineering professional with 8+ years of combined experience in advanced academic research, teaching and industry. Aiming to leverage my skills for the advancement of knowledge through research and development.

EDUCATION

Ph.D., Materials Engineering **Dec 2020.**
Purdue University, West Lafayette, IN.
DISSERTATION: *Hybrid Cutting - Extrusion of Commercially Pure Aluminum Alloys*.

B.S. Mining Engineering **July 2012.**
University of Mines and Technology, Tarkwa, Western Region, Ghana,
FINAL PROJECT: *Economic Analysis of Truck Haulage System of Bauxite from Awaso to Takoradi Harbor*

RESEARCH / TEACHING EXPERIENCE

Graduate Teaching Assistant **Aug. 2016 to Dec. 2020**
Purdue University, West Lafayette, IN.

- Taught Fundamentals of Materials Engineering to undergraduate students of diverse engineering backgrounds for student size of 100+ students (Spring 2019 and Fall 2020).
- Delivered in-class lectures on weekly basis, administered, proctored and graded student assignments and examinations.
- Under Covid-19 conditions, provided virtual lectures through Kaltura on Brightspace, virtual office hours through zoom conferencing and constantly reminded and encouraged students to follow all safety guidelines to avoid contracting the disease.
- Designed a course for metallurgical processing of metals
- Taught and supervised undergraduate students through experiments in the laboratory and assisting them with technical report writing and presentations.

Graduate Research Assistant **Aug. 2016 to Dec. 2020**
Purdue University, West Lafayette, IN,

- Specialized in the development and processing of high strength, high electrical conductivity and high temperature non-ferrous alloys through microstructural development in casting, solidification, solution heat treatment and deformation processing.
- Demonstrated the feasibility of using concentrated shear, hybrid cutting and extrusion deformation technique to suppress flow instabilities that are intrinsic to soft and ductile ("gummy") metals during machining.

- Produce aluminum electrical conductor wires of high strength and superior surface finish compared to conventional multi-step cold rolling and wire drawing by employing a single-step machining-based deformation.
- Developed a process map that addresses multiscale surface folding resulting from flow instabilities in the machining of soft aluminum and copper alloys using high speed imaging, particle image velocimetry and 3D surface profilometry.
- Examined solute-solvent interactions in phase transformation and defect formation in high electrical conductor alloys to demonstrate that solutes in solution are more injurious to electrical properties of metals than solutes out of solution.
- Practiced and enforced housekeeping practices and the implementation of general safety standards in laboratory spaces to achieve incident free work environment.
- Engaged in the preparation of project-related reports, manuscripts, journal articles and conference presentations.

TEACHING AND RESEACH SKILLS

- **Core teaching skills:** Course design, Lecturing/Tutoring, Classroom Management, Exam Proctoring/Grading, FERPA Certified, Mentoring, Blackboard/Brightspace Learning Management Software.
- **Core research skills:** Materials characterization**,** Alloy development, Metal casting, Heat treatment, Machining, Cold and hot rolling, Metallography, Residual stress analysis, Elemental analysis, Mechanical testing, Failure and fracture analysis, SEM, EBSD, EDS, X-ray diffraction, and 3D optical profilometry.
- **CAD design tools:** Fusion 360, SolidWorks, Ansy, Inkscape.
- **Data analytics and visualization tools**: Python, AWS, Tableau, Excel, MATLAB, and OriginLab
- **Project Management tools:** Salesforce, AWS, MS Access and agile project management

PUBLICATIONS

M. N. Issahaq, S. Chandrasekar, K. P. T., 2020, "Single-Step Shear-Based Deformation Processing of Electrical Conductor Wires," ASME J. Manuf. Sci. Eng. doi: https://doi.org/10.1115/1.4048984

M. N. Issahaq, S. Chandrasekar, K. P. T., "Multiscale Folding in Dry Cutting of Soft Commercially Pure Aluminum", (Upcoming).

M. N. Issahaq, M. Sae, S. Chandrasekar, K. P. T., "Surface Metrology of Machined Chips in Soft Aluminum Alloys", (In draft).

S. P Rodriguez, M. Sae, M. N. Issahaq, J. Mann, S. Chandrasekar, K. P. T., "Metal Strip Production by Free Machining and Hybrid Cutting Extrusion: A Demonstration, (In draft).

CONFERENCE PRESENTATIONS

The Minerals, Metals & Materials Society (TMS) Conference, San Diego, CA. **Feb. 2020.**
"Production of Commercially Pure Aluminum Strips via Single-Step, Shear-Based Techniques"

The Minerals, Metals & Materials Society (TMS) Conference, San Antonio, TX. **March 2019.**
"Surface Morphology of Commercially Pure Aluminum Electrical Conductor Wires Produced via Single-Step Machining-Based Techniques"

Materials Science & Technology (MS &T) Conference, Pittsburgh, PA. **Oct. 2017.**
"Shear-Based Processes for the Production of Strong Aluminum Electrical Conductors"

DEPARTMENTAL TALKS

Laboratory for Advanced Materials Processing (LAMP) Seminar, Purdue University.
"Large Strain Extrusion Machining for the Production of Strong Aluminum Electrical Conductors" **Sept. 2018.**

Center for Materials Processing and Tribology, Purdue University. **April 2018.**
"Stick-Slip Phenomenon in the cutting of soft metals"

Materials Engineering Department Seminar, Purdue University. **Jan. 2018**.
"Effects of Solutes on the Electrical Resistivity of Metal Alloys"

PROFESSIONAL EXPERIENCE

Data Mine Corporate Partner **Aug. 2020 to Dec. 2020**
CAT DIGITAL / PURDUE UNIVERSITY, West Lafayette, IN.

- In partnership with CAT Digital, developed a smart AI solution to reproduce thought processes in predicting equipment failures based on telematics data streams.
- Applied agile project management frameworks to plan our sprints and to deliver on the sprint objectives of the team.
- Collaborated with team members to address member problems, while productively and creatively delivering on our sprint goals.

Mine Operations Superintendent **Sep. 2014 to July 2016.**
MAXMASS LTD, Tarkwa, Western Region, Ghana.

- Supervised mining and fleet dispatch operations to achieve production targets under safe mining conditions
- Performed short- and medium-term planning of equipment schedules, reports and estimates of production volumes and overall operational effectiveness.
- Under strict guidance of production crew, achieved zero lost time injuries for two consecutive years by implementing measures such as mandatory equipment operator walkabout during night shifts.

Business Improvement Officer **Aug. 2012 to Feb. 2014.**
GOLDFIELDS GHANA LTD (GFGL), Tarkwa, Western Region, Ghana.

- Instituted continuous monitoring of drill and blast activities and quality control parameters, thus, improving blast fragmentation, powder factors and dump trucks tire life.

- Planned the schedules, monitored drill rigs performance and kept inventory of drill bits to enhance the performance and efficient use of drill machines.
- Assisted in achieving higher safety records with zero lost time injuries at the drill and blast sites for 5 consecutive months by ensuring strict adherence to the safety standards.

TRAINING AND CERTIFICATIONS

- Operations Analytics, **Jan. 2021.**
- Six Sigma Green Belt, **Jun. 2020.**
- MATLAB, **Jun. 2020.**
- Python, **May 2020.**
- Blasting Certificate of competency, Minerals Commission, Ghana **May 2015.**

LEADERSHIP AND SERVICE

Secretary, Material Science and Engineering Graduate Students Association (MSEGSA).
Purdue University, West Lafayette. IN. USA. **2018/2019**

Volunteer, MSEGSA Outreach on Materials Science / Renewable Energy
Jefferson High School, Lafayette. IN. USA. **Mar. 2019**

Volunteer, Materials Engineering Prospective Students Laboratory Tour **Apr. 2018**
Purdue University, West Lafayette. IN. USA.

Volunteer, 9th NanoDays Event, Birk Nanotechnology Center **Apr. 2018**
Purdue University, West Lafayette. IN. USA.

PROFESSIONAL AFFILIATIONS AND MEMBERSHIPS

- American Society of Mechanical Engineers, ASME
- National Society of Black Engineers, NSBE Purdue
- Minority Engineering Program, MEP Purdue.
- Association for Iron & Steel Technology, AIST
- ASM International
- Minerals, Metals & Materials Society, TMS
- American Ceramic Society, ACerS