Position Title: Postdoctoral Research Associate  
Department: Chemistry  
Reports To: Drs. Issifu Harruna and Eric Mintz

The following statements are intended to describe the general nature and level of work to be performed and are not intended to be construed as an exhaustive list of all responsibilities, duties, and skills required of personnel so classified. All duties listed are essential functions for the position. It is understood that other related duties may be assigned.

General Function (Description):

Overview:
Seeking a Postdoctoral Research Associate who will focus on preparing, characterizing, and studying 100% bio-based biodegradable composites that compete with non-sustainable petroleum-based composites based on performance and cost. The nanocomposites will be prepared from bio-based polymer such as polylactic acid (PLA), polyhydroxyalkanoates (PHAs) and cellulose nanocrystals (CNCs) by high torque melt mixing or extrusion. The addition of other additives to modify composite properties will also be examined. The goal of the project is to develop composites that are amenable to standard melt processing techniques and can be recycled or degraded in the environment or via composting. Additionally, the research fellow will work as part of a team developing a structure-processing-property relationship for the incorporation of CNCs in polymer matrix composites (PMCs.) The associate may also will conduct Molecular Dynamics (MD) simulations to investigate the CNC-lignin, lignin-matrix, and CNC-lignin-matrix interactions at the molecular level.

In addition, the associate will be required to synthesize and characterize monomers that will be used in anionic polymerization reactions via green chemistry.

Materials characterization will be performed by multiple methods e.g. DSC (differential scanning calorimetry), TGA (thermogravimetric analysis), DMA (dynamic mechanical analysis), NMR and FT-IR spectroscopy, GPC (gel permeation chromatography), SEM (scanning electron microscopy), and AFM (atomic force microscopy).

We are looking for applicants with a demonstrated research background in organic/polymer chemistry synthesis and characterization. Experience in instrumental characterization in several of the instruments identified in the previous paragraph is desired. The Research Associate will also work within a multidisciplinary team involving specialists in materials, processing, characterization, synthesis, computational chemistry and materials, and data science.
Major Duties and Responsibilities:

- Work with a diverse team of scientists seeking to advance scientific understanding of advanced structural property relationships of sustainable polymers and materials.
- Carry out synthesis, characterization, and processing of functional polymers and polymer composites.
- Independently plan and conduct theoretical simulations and collaborate with other researchers to identify the best methodology for structure calculations of materials of interest.
- Participate in project planning and execution and write progress reports and manuscripts.
- Present research results at meetings/conferences and publish scientific results in peer-reviewed journals in a timely manner.
- Provide leadership working within the CAU Partnership in Research and Education in Chemistry (PREC) and the Center for Sustainable Polymers (CSP).
- Work closely with faculty, graduate and undergraduate students on the execution of projects.

Knowledge, Skills, and Abilities:

This position requires knowledge of the general area of Organic Polymer or Materials Science via a background in doctoral level research in the Chemical, Physical, or Materials Sciences. Prior experience of working within a University community is highly desired. Must have excellent written and oral communication skills. Candidates must be computer literate and familiar with laboratory safety and hygiene is necessary. Successful use of advanced scientific instruments (e.g., DSC, TGA, FT-IR, NMR, etc.) is required.

Minimum Hiring Standards:

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<thead>
<tr>
<th>Education</th>
<th>Earned doctorate in Chemical, Physical, or Materials Sciences</th>
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<tbody>
<tr>
<td>Years of Experience</td>
<td>Two years of research experience, which can include doctoral dissertation research</td>
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<tr>
<td>Years of Management/Supervisor Experience</td>
<td>Not required</td>
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