Opportunity Title: Computer Scientist for Additive Manufacturing of Polymers
Opportunity Reference Code: ARL-R-WMRD-300050

Organization DEVCOM Army Research Laboratory

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Description **About the Research**

The Materials and Manufacturing Sciences Division of the Army Research Laboratory (ARL) is seeking a candidate with expertise in computer programming and scripting languages to expand the printability of integrated 3D printing processes of heterogeneous multi-materials multiple but to seamlessly optimize the 3D printing build strategies of commercial and home-made polymer 3D printers. The primary focus of the research will be to develop scripting and other computer programing codes to seamlessly develop and modify g-code slicing of CAD diagrams to make necessary and repetitive coding to control stop/start functions, translation functions, print speeds, and print paths to improve the printability to build complex 3D parts. Implementing controls and enabling facile modification of such controls for in-situ process add-ons, such as light curing attachments, fans, heaters, and cameras, is important. To scientifically assess the effects of these modifications on 3D print quality, the researcher will work with ARL personnel to design and print baseline and variable prints to qualitatively and quantitatively assess the benefits.

The overall objective of the research is to develop/debug codes and modify hardwares to reduce the time from design to build of 3D prototypes printing and improve the quality of the 3D printed parts by precisely manipulating printing controls. Training will be available to teach the researcher any lacking techniques and instrumentations. The candidate must have good verbal skills in order to disseminate findings within ARL. The candidate must be willing and able to work in a team environment. Working towards a degree in science or engineering is required, with a preference for computer science/engineering, although other related fields would also be considered. In all cases, the mentor(s) will be working with the researcher on a regular basis at a frequency dependent on the candidate's experience.

Keywords: 3D printing, computer programming, scripting, print path optimization, controls, sensors.

ARL Advisor: Ian McAninch

ARL Advisor Email: ian.mcaninch2.civ@mail.mil

About WMRD

The goals of the Weapons and Materials Research Directorate (WMRD) are to enhance the lethality and survivability of weapons systems, and to meet the soldier's technology needs for advanced weaponry and protection. Research is pursued in energetic materials dynamics, propulsion/flight physics, projectile warhead mechanics, terminal effects phenomena, armor/survivability technologies, environmental chemistry, and advanced materials (energetic, metals, ceramics, polymers, composite/hybrids, and

mechanics) for armor, armament, missiles, ground vehicles, helicopters, and individual soldier applications necessary for maintaining and ensuring supremacy in future land warfare.

About ARL-RAP

The Army Research Laboratory Research Associateship Program (ARL-RAP) is designed to significantly increase the involvement of creative and highly trained scientists and engineers from academia and industry in scientific and technical areas of interest and relevance to the Army. Scientists and Engineers at the CCDC Army Research Laboratory (ARL) help shape and execute the Army's program for meeting the challenge of developing technologies that will support Army forces in meeting future operational needs by pursuing scientific research and technological developments in diverse fields such as: applied mathematics, atmospheric characterization, simulation and human modeling, digital/optical signal processing, nanotechnology, material science and technology, multifunctional technology, combustion processes, propulsion and flight physics, communication and networking, and computational and information sciences.

A complete application includes:

- **Curriculum Vitae or Resume**
- **Three References Forms**
  - An email with a link to the reference form will be available in Zintellect to the applicant upon completion of the on-line application. Please send this email to persons you have selected to complete a reference.
  - References should be from persons familiar with your educational and professional qualifications (include your thesis or dissertation advisor, if applicable)
- **Transcripts**
  - Transcript verifying receipt of degree must be submitted with the application. Student/unofficial copy is acceptable

If selected by an advisor the participant will also be required to write a **research proposal** to submit to the ARL-RAP review panel for :

- Research topic should relate to a specific opportunity at ARL (see Research Areas)
- The objective of the research topic should be clear and have a defined outcome
- Explain the direction you plan to pursue
- Include expected period for completing the study
- Include a brief background such as preparation and motivation for the research
- References of published efforts may be used to improve the proposal

A link to upload the proposal will be provided to the applicant once the advisor has made their selection.

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Questions about this opportunity? Please email ARLFellowship@orau.org

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Bachelor's Degree, Master's Degree, or Doctoral Degree.
- **Academic Level(s):** Any academic level.
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (16 👁)
  - **Engineering** (4 👁)
- **Age:** Must be 18 years of age