James S. Collins

pmrc.marc.gatech.edu/james-collins jscollins.engineer

Expertise:

Robotics & Automation
- Trained in industrial robotic arm safety and operation
- Inverse kinematics, rigid body transformations, quaternion rotations and classical controls

Multi-Axis CNC
- Programmed and operated 7 different industrial CNC machines
- 2+ years of experience with automated manufacturing systems

Team Leadership
- Team leader for 6 different academic group projects
- Instructed 200+ students in technical concepts and safety

Education:

Georgia Institute of Technology, Atlanta, GA *Expected Graduation Summer 2018*
Masters of Science in Mechanical Engineering
- GPA: 3.66
- Graduate Research Assistant

Georgia Institute of Technology, Atlanta, GA *Fall 2013 – Spring 2017*
Bachelor of Science in Mechanical Engineering
- GPA: 3.77
- Graduated Highest Honors

Southern Polytechnic State University, Marietta, GA *Fall 2012 – Fall 2013*
- GPA: 4.0

Professional Experience:

Graduate Research Assistant *05/2017 – present*
- Applying medical imaging registration techniques to computer-aided manufacturing
- Investigating use of quaternions to drive rigid transformation of voxel volumes
- Leveraging 3D scanning technology for model-free manufacturing
- Programming genetic algorithm optimization in Matlab
- Implementing cloud-based GPU parallel programming

Caterpillar Engineering R&D Intern *05/2016 – 08/2016*
- Introduced Robot Operating System (ROS) implementation on single board computers
- Studied operation of 3 different industrial robotic arms
- Measured engine part wear with Keyence laser scanner
- Constructed augmented PPE prototype
- Presented research findings to R&D leadership

Prototyping Instructor at Georgia Tech's Invention Studio *08/2015 – 08/2017*
- Oversaw machine shop and mentor/trained students
- Administered CNC wood router repair and maintenance
- Organized training sessions for 30+ student lab instructors
- Instructed 200+ students in proper equipment use and safety

Project Experience:

Precision Machining Research Consortium, Undergraduate Research Assistant *09/2015 – 05/2017*

- Co-authored paper in Journal of Manufacturing Science and Engineering
- Researched voxel-based CAM and contributed to new software development
- Machined parts on Okuma/Mazak multi-axis CNC for CAM trials

Senior Design Capstone Project, Team Lead *Spring 2017*

- Designed and constructed prototype cable suspended parallel robot
- Mechanized masonry scaffolding
- Scheduled meetings and sponsor report briefings

Caterpillar Augmented PPE, Engineering Intern *Summer 2017*

- Integrated VR glasses/head-up display and brainwave sensor into hardhat
- Provided demonstration of future applications to efficiency and safety

Mechatronics (ME6405) Course Project, Graduate Student *Present*

- Building TI Launchpad driven CNC 3-axis gantry robot
- Programming G-Code interpreter and motor controller

Publications:

Direct Digital Subtractive Manufacturing of a Functional Assembly Using Voxel-Based Models, Co-Author
ASME Journal of Manufacturing Science and Engineering, 02/01/2018, Vol.140(2)

- Advances automated subtractive machining
- Examines direct digital subtractive manufacturing of an assembly free ball-in-socket mechanism
- Case study machined on 4+1-axis millturn

Skills:

Automation Equipment & Machines

- ABB Robotic Arm, Motoman Robotic Arm, Okuma Multus CNC, Mazak 5-Axis CNC, Wolf Robotics, ProtoTRAK CNC Mill & Lathe, Linux CNC, Okuma Genos Lathe, Okuma MBV Mill, FARO 3D Scanners, Keyence Laser Scanners, LPKF Circuit Board Plotter

Programming

- C, Matlab, Python, Basic Embedded Systems Programming, G-Code, GPU Parallel Processing, Python GUI

CAD/CAM

- Siemens NX, Solidworks, HSMworks, Inventor, Fusion 360, AutoCAD, Mach3, WinCNC

Microcontrollers/Single Board Computers

- TI MSP LaunchPad, Raspberry Pi, Beaglebone Black, Arduino

Hardware

- Stepper Motors, Encoders, Strain Gauges, Thermocouples

Safety Training

- CAT Robot Safety, CAT Welding Safety, X-Ray Safety, Advanced Machine Shop Safety

Manufacturing Equipment

- Manual Machining, Basic Welding, OMAX Waterjets, Trotec Laser Engravers

Communication

- Presentations, Working Drawings, Use Case Diagrams, Axiomatic Design, Public Speaking, Technical Reports

Honors:

- Pi Tau Sigma Mechanical Engineering Honors Society
- Tau Beta Pi Engineering Honors Society
- Gamma Beta Phi Honors Society
- Inducted into the Order of the Engineer

Georgia Institute of Technology
The George W. Woodruff School of Mechanical Engineering

March 3, 2018

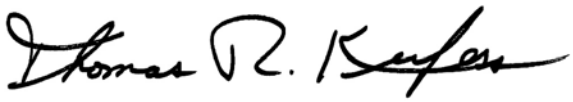
To Whom It May Concern:

It is my pleasure to write this letter of recommendation for Mr. James Collins a Master's degree candidate in the School of Mechanical Engineering at Georgia Tech. I have known Mr. Collins for about 4 years during which time he has conducted research as both a graduate and undergraduate student with my team in the digital manufacturing area and performed exceptionally well. His current project focuses on integration of reverse engineering information into voxel based geometric models for rapid reverse engineering applications. During the course of his work, James has demonstrated that he has a firm grasp of hardware, software and integration techniques, as well manufacturing. He always completes his deliverables in advance of their due date, and they always function perfectly. Furthermore, he is extremely capable in presenting (written and oral) the results of his work to our industry sponsors.

I have also had the opportunity to chat with James about topics other than those covered in his research project. He has often come to my office to discuss graduate school and opportunities available to him after completing graduate school. From these conversations, I believe that James has quite a mature perspective on education and that he will set an example for others to follow.

In conclusion, James is an intelligent individual and a great person. He is an extremely sharp engineer and capable of conducting independent research as well as being a team member. He is one of the most innovative members of my team, and always delivers high quality results in a very timely manner. I highly recommend him to your program. In fact, if he were to choose to continue his work as a Ph.D. candidate at Georgia Tech I would fund him as part of my team. If you have any questions concerning this letter or James, please feel free to contact me.

Sincerely,



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