

2017 YS Summary

Student Participants

The 2017 summer's program included two Young Scholars: Olga Fialkova, an eleventh grader attending the Middle College at Guilford Technical Community College and Naya Henry, a junior at Weaver Academy.

The following tables highlight the program participants.

Gender:

<u>Male</u>	<u>Female</u>
0%	100%

Racial Distribution:

<u>Black/African-American</u>	<u>Asian-American</u>	<u>Caucasian-American</u>
50%	0%	50%

Age Distribution (at program start):

<u>15</u>	<u>16</u>	<u>17</u>
0%	100%	0%

Both were residents of Guilford County.

Program Staff

Many NSF ERC RMB personnel contributed to the success of the 2017 Young Scholars Program. Some key individuals are listed below:

Jagannathan Sankar	Executive Director
Devdas Pai	Director for Education and Outreach
Lois Deve	Administrative Director
Robin Liles	Associate Director for Education Assessment
Vernal Alford	Coordinator, Young Scholars and Research Experiences for Teachers
Victoriya Yefimova	Budget Assistant
Dhananjay Kumar	Faculty Research Mentor
Svitlana Fiatkova	Faculty Research Mentor

Program Description

Young Scholars participated for six weeks in a commuter, paid research experience. The program consisted of an orientation, workshops, seminars, focus groups, briefing sessions, newsletter and journal production, a poster session, field trips, faculty-driven research, final presentations, opening and closing programs. The Young Scholars program operated concurrently with the Research Experience for Teachers (RET) programs. Many of the activities were conducted together.

Joint Program

The Orientation was a day long exercise to get participants acclimated and prepared for the program. During the joint RET-Young Scholars Opening Program, many of the individuals with whom the Young Scholars would make contact were introduced. All necessary forms were verified as completed and submitted to ERC personnel. The program provided training on documentation, including laboratory notebooks and intellectual property. During the afternoon, the participants underwent Safety Training led by the campus Safety Office. Because of campus policy, that all campus program participants must carry appropriate identification, the Young Scholars were subsequently photographed and received their Aggie One cards. In conjunction with the RET program, library staff conducted a seminar on researching scholarly articles.

Two workshops were presented during the program. The first was facilitated by Ms. Donna Eaton, Division of Research, and entitled “Responsible Conduct in Research.” The second workshop, “Presentation Techniques”, was delivered by Dr. Tonya Hargett, Division of Research.

Various seminars were held throughout the program. The center’s Director for Education and Outreach gave an overview of the ERC. Dr. Robin Liles entitled her seminar “Bioethics.” Matthew McCullough’s seminar topic was “Computational Biomechanics”; Dr. Laura Collins presented on “Intellectual Property.” Dr. Zhigang Xu facilitated a seminar based on his research. The RETs and Young Scholars presented their six-week research experience to the other programs’ participants during the last seminar. Journal Club meetings were held on Friday afternoons.

Program Feedback and Continuous Improvement

Briefing sessions were held every week for the Young Scholars. These were held to elicit feedback from the participants and the coordinator. During these times, Scholars submitted their weekly journals both orally and electronically. The Coordinator would review the upcoming schedule, particularly any changes, so that any confusion might be quelled. Instructions would be given on preparing newsletters, journals, posters and final oral presentations. The group would also go through the topics covered in the Technical Testing to prepare individuals for the post-testing. The Coordinator would also use that time to encourage the participants.

Competition

The Poster Defense was held on Wednesday, July 26, 2017. The research teams were grouped aligning with faculty mentors.

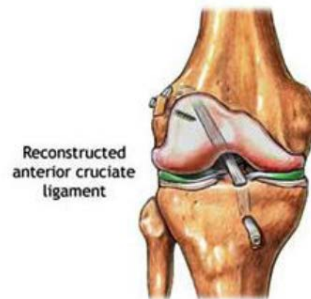
Field Trips

Field trips were to The Nussbaum Center for Entrepreneurship, Greensboro and the Joint School of Nanoscience and Nanoengineering located at Gateway Research Park South, Greensboro. The joint program participants were conveyed by vans to the joint department of Biomedical Engineering at North Carolina State University and the University of North Carolina in Raleigh and Chapel Hill, respectively.

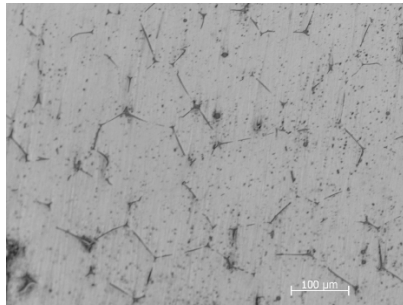
Research of the Scholars

The Young Scholars presented their research on Wednesday, July 26, 2017 to visitors and faculty mentors. Other joint program participants and graduate student mentors also were in the audience. Each scholar was to present, with PowerPoint slides, for 7 to 8 minutes. The balance of the Scholar's 10-minute segment was dedicated to a question and answer period.

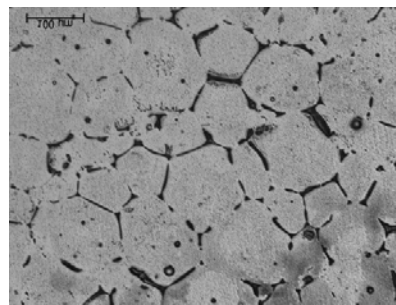
The focus of **Olga Fialkova's** research was Computer Modeling a Screw Implant for a torn ACL. Using a CAD (Computer-Aided Design) software package, she designed two different fixation screws. She endeavored to improve the screw thread so that it has a stronger pullout strength without damaging the screw and the bone. Ms. Fialkova analyzed different screws using SolidWorks 2016. She looked at variations of the Knuckle and Trapezoidal screws.



Naya Henry conducted research on the Effect of Zn Content on Structure of Mg Alloys. She had access to the Wyko RST-500 Optical Surface Profiler, the Horiba Scientific XGT-7200 X-ray Analytical Microscope and the Zeiss Axiomager M2M Optical Microscope to investigate the specimen's surface, composition and grain images, respectively. She also had to polish and chemically etch the samples. The Image Pro software allowed Ms. Henry and the research team to conduct complicated image analysis - to analyze different kinds of features at the same time. She concluded the measurement methods do not affect the grain size but the sample preparation method does affect the quality of grains boundaries and therefore measurements quality. Also analysis of optical micrographs Mg-Zn-Ca alloys did not show significant dependence of grain sizes from Zn concentration.



Polished Sample



Etched Sample

