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## Creating the “Best and Brightest” within the Pittsburgh Public School District

This paper explains a concept by Carnegie Mellon University professor, C. Fred Higgs, III, to integrate frontier engineering research and education with initiatives that positively impact the Pittsburgh Public School District. Dr. Higgs, an assistant professor in the mechanical engineering department at CMU, would serve as the principal investigator (PI) in this effort. His educational background consists of a B.S. in mechanical engineering (MechE) from Tennessee State University, and M.S and Ph.D. degrees from Rensselaer Polytechnic Institute. He also was a post-doctoral fellow at the Georgia Institute of Technology in the mechanical engineering department from 2001 – 2003. The PI is working to establish an internationally recognized research and education program that also impacts the economically-disadvantaged pre-college community.

Some of the characteristics embodied by the PI’s Particle Flow & Tribology Laboratory (PFTL) are:

- Strong intellectual merit on the scientific and educational components of the PFTL;
- creative and integrative education components including lab demonstrations in the tribology class;
- commitment to education outside the normal role of an academic professor but with a reasonable time commitment of no more than *2 hours per month* (i.e., partnership must be acquired to achieve success);
- Emphasis on an integration of science objectives with the education of underrepresented groups and/or non-traditional partnerships with individuals outside the professor’s own institution.

It is the last element that this concept paper is addresses.

A resident in the city of Pittsburgh, the PI has been searching for a school system to “integrate science objectives with the education of” its students. He has identified the Pittsburgh public school district as a haven of hope that would greatly benefit from exposure to cutting-edge engineering and science technology. The PI has decided that the best approach is to start with a 9<sup>th</sup> grade class and perform work that includes the following:

- Semi-annual workshops on nanotechnology and the future of engineering;
- Motivational workshops about science, technology, engineering, math (STEM), and “attending college”

These workshops would be conducted by the PI and students from his Carnegie Mellon University research laboratory. From these students, the teachers of the 9<sup>th</sup> grade class and the PI would identify **(no selection criteria formulated)** “Generation Next” (GN) scholars that would be allowed to:

- Attend the Minority Introduction to Engineering (MITE) program at Tennessee State University (TSU) for two-weeks. (TSU has allotted six spots per year to the PI for its high-demand program),
- Take field trips to engineering sites,
- Take field trips to CMU labs, events, and various pro-college initiatives.

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NOTE: The number of GN Scholars selected will be no greater than the number of graduate students in the PI's laboratory. Upon the graduation of the pilot students, the program would begin a new cycle with the incoming 9<sup>th</sup> grade class. Therefore, this short-term effort would serve as the pilot effort for a longer term model. **Perhaps, it will be adopted by other professors, laboratories and institutions.** A measurable outcome would be the enthusiasm of the GN scholars, and their successful matriculation to college. Hopefully, they will major in engineering and or STEM related fields.

As the “Generation Next” scholars matriculate through high school, this project would help them set higher goals and be more likely to pursue careers in STEM-related areas. Essentially, this is an “adopt-a-possé” program, where essentially a university professor's laboratory would mentor a core group of high potential, yet at-risk, pre-college students and expose them to cutting-edge science and engineering. The project serves to awaken the talent and enthusiasm of the entire class, as the PI believes that being the so-called “best and brightest” is primarily a function of exposure. This is important because, currently, the pipeline for engineering talent is not providing enough talent flow. Innovative strategies for producing more talent from the critical untapped masses must be developed. This means that talent must be located in new pools, e.g., disadvantaged communities and/or within the so-called “average” yet motivated students.

It should be noted that this is not a grandiose, all-encompassing, program. It consists of approximately 2-3 workshops each academic year, field trips following year 1, one-on-one external mentoring sponsored by the Pittsburgh Urban League, mentorship activities sponsored by the PI's research group (many who are minorities), and attendance to an out-of-state pre-college engineering program—MITE. The MITE program administered by the College of Engineering at Tennessee State University, a Historically Black College and University (HBCU) located in Nashville. The students in the urban Pittsburgh schools such as Westinghouse High School need to see a “different world”, which is full of engineering scholars who look like them. The counselors, teachers, and administrators of the MITE program are largely African-American engineering majors or graduates. The Dean of the College of Engineering at Tennessee State University has agreed to reserve 6 openings for the *Generation Next* scholars from these Greater-Pittsburgh communities each year. Lastly, it should be noted that the PI is a product of this same MITE program.

## **Biography**

**C. Fred Higgs III** received his B.S. in mechanical engineering from Tennessee State University in 1995. He received his M.S. and Ph.D. in mechanical engineering at Rensselaer Polytechnic Institute (RPI) in 1997 and 2001 respectively. As the founder and president of goCarpeDiem Inc. ([www.gocarpediem.com](http://www.gocarpediem.com)), he has conducted numerous seminars, workshops, and motivational speeches and has made over 12 appearances as keynote speaker or panel member since 1992. In 1998, he was interviewed in the national publication *Black Issues in Higher Education* on effective methods for motivating college students. He started as an Assistant Professor in the Department of Mechanical Engineering at Carnegie Mellon University in mid-Fall of 2003. His “Particle Flow and Tribology” lab studies powder, slurry, and granular flow at various length scales in various tribological and flow applications.