Experiences of Pre-College Teachers Working with Undergraduate Engineering Students with ADHD in Research Laboratories

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Abstract

Students with Attention Deficit Hyperactivity Disorder (ADHD) are significantly underrepresented in engineering programs despite their high potential to impact the field through their strong divergent thinking and unparalleled risk-taking abilities. The current engineering education system has yet to realize the unique potential of these students and largely fails to attract and retain them due to the overemphasis on lecture-based learning and its discouraging evaluation methods. The abilities of these students are often overlooked in pre-college environments as well, where educators typically approach ADHD from a deficit perspective, which has engraining impacts on the student's confidence and self-image. To recognize the unique intellectual strengths of engineering students with ADHD and encourage them to continue in engineering careers, a specialized National Science Foundation funded Research Experience for Undergraduates (REU) Site for students with ADHD was established. To extend the impact and findings of the REU program to pre-college students, two teachers, one fourth and one ninth grade, joined engineering research labs at the University of Connecticut as NSF Research Experiences for Teachers (RET) Fellows, and spent six weeks working with undergraduate student researchers with ADHD. These grade levels were chosen to involve teachers from both elementary and secondary education. In addition to taking part in the research activities, the teachers attended multiple roundtable discussions where the REU students shared their experiences in both their personal lives and their engineering programs. This provided a unique opportunity for the teachers to observe firsthand the performance of students with ADHD outside of a traditional classroom setting when they are involved in interest-provoking tasks that actively demand creative thinking, i.e. research.

This paper presents the major observations and experiences of the two RET fellows after completion of the program. The program significantly improved the teachers' perceptions of students with ADHD and the shortcomings of the current education system that puts this population of students with significant potential for innovation at a substantial risk of academic failure and disinterest in pursuing higher education. Overall, the major observations from this REU were that: given the right environment, i.e. niche, students with ADHD can thrive; engineering research can be a stimulating and ideal environment for students with ADHD; and the opportunity to learn and interact with peers with ADHD can provide a rich and meaningful experience and help their confidence and ability as learners. It was noted that the education system needs to move from the idea of 'accommodating' for some, to differentiating for all. Dissemination of these impactful findings will continue through the teacher's discussions with colleagues, administrators, and by publishing papers. Employing a different approach to planning meaningful lessons and activities that support all learners' contributions, necessarily implies utilization of more diverse evaluation methods, as well as teaching strategies. The uniquely attractive components of engineering, i.e., real world applications, the design process, and creative problem-solving, can capture the curiosity and imagination of these students who can solve the most complex and challenging problems facing our nation.

Introduction

Engineering is a branch of the sciences that is uniquely poised to solve some of the most critical problems facing society today. Global warming, cybersecurity, critical infrastructures, and alternative forms of energy represent just a few of the most complex and immediate challenges confronting society as we move further into the 21st century. The problems themselves are diverse, complex, and multi-dimensional. Therefore, developing solutions requires multi-layered, creative, innovative approaches. Given that engineers will be tasked with solving such an array of dilemmas, it is incumbent on the education system in the United States to attract and develop talent in the most inclusive manner. Current and future engineers must be able to think creatively and innovatively. Successful solutions can only be arrived at through the richness of interactions between multi and differently talented individuals. Unfortunately, and increasingly, our educational system has narrowed the definition of academic success using highly standardized measures of achievement. The emphasis on convergent thinking and repackaged solutions ignores the promise of the divergent thinker[1]. Variations in learning style, abilities, and modes of communication and creative expression are marginalized, rather than embraced.

One such type of neurodiversity shown to be associated with innovation and creativity is Attention Deficit Hyperactivity Disorder (ADHD)[2,3]. Despite the correlation between ADHD traits and increased creativity, students with ADHD are highly underrepresented in engineering majors [2,4]. A study examining a sample of college students with ADHD found that only 3% of these students were studying engineering, while 76% were enrolled in colleges of arts and sciences [4]. Individuals with ADHD often encounter difficulties with time management, initiating and completing tasks, procrastination, and forgetfulness which may contribute to their generally lower grade point averages [5,6]. Students with ADHD are more likely to be on academic probation, less likely to attend and graduate from college, and twice as likely to drop out of engineering programs compared to their non-ADHD counterparts [7,8].

Many studies exist canvassing the problem of retention of students in engineering programs [8-10]. Nearly twenty years ago, Felder and Silverman recognized the disconnect between teaching styles and learning styles in engineering at the college level [11]. Negative stereotypes toward neurodiverse learners abound within both academic and social frameworks [12,13]. Moving to a strength based definition of neurodiverse learners will require a fundamental and necessary shift in our ability to attract and retain those uniquely abled, neurodiverse idea generators and problems solvers who are innately best suited to effecting change and progress in engineering.

To increase the participation of a traditionally underrepresented population of students and begin to dismantle the deficit based view of ADHD, a specialized Research Experience for Undergraduates (REU) Site titled "REU Site: Research Experience in Cyber and Civil Infrastructure Security for Students with ADHD: Fostering Innovation", has been funded by the NSF Division of Engineering Education and Centers. The REU Site offers research opportunities in the security of critical infrastructures to undergraduates with ADHD. This program is designed to cultivate the unique strengths of students with ADHD including divergent thinking and risk taking. Although the REU program is strictly for undergraduates, the lessons learned from this site may then be used to increase participation and success of these students at all education levels. To extend the impact and findings of the REU program to pre-college

students, two teachers, one fourth and one ninth grade, joined engineering research labs at the University of Connecticut as NSF Research Experiences for Teachers (RET) Fellows, and spent six weeks working with undergraduate student researchers with ADHD. This paper presents the major observations and experiences of the teachers, principal investigator, and program manager after completion of the program.

The nine participating students enjoyed hands-on nature of working in research labs. Their ability to hyperfocus and make impressive contributions to their respective projects was noted by the faculty and graduate mentors. The workshops and roundtable discussions helped create a supportive environment where students were able to share their past experiences and challenges within the current rigid education system. These discussions helped the students realize that their challenges were fostered by the failing one-size-fits-all education system rather than a personal deficiency. The students were engaged with the two teachers and welcomed the opportunity to share their past experiences and suggestions for improving traditional education practices. Overall, the program stimulated the participants' interest in pursuing engineering and graduate school while improving their self-confidence.

Background

Difference vs. Deficit Based Approach to Neurodiversity

Commonly regarded "disorders" that contribute to thinking outside of the neurotypical "norm", such as ADHD, autism, mood disorders, dyslexia, and anxiety, are unfortunately often considered deficits, rather than a healthy part of the diverse spectrum of human cognition [14,15]. These differences are regularly described in negative, deficit-based terms such as "impairment", "challenge", and "failure"[16]. For the purposes of this paper, we will focus on ADHD as an example of a divergent style of thinking that is too often relegated to the category of disorder, rather than celebrated for its potential. Even the name ADHD, which contains the words "deficit" and "disorder" automatically frames ADHD in a negative light and "may bias individuals against realizing the potential, strengths, and gifts that many children with ADHD have." [16-18]. While the ADHD child or adult is often portrayed as a difficult and irresponsible individual, there is considerable evidence that ADHD, in many circumstances, is an enormous advantage.

Significant research has been done into the evolution and adaption of ADHD traits - which may be re-inspected as the very traits that helped early humans survive [17,19-21]. The infamous inattention of the ADHD individual may also be viewed as scanning and surveying, to get a better picture of one's surroundings – a trait that would have been very helpful to early hunting and gathering humans. Impulsivity may be viewed as a significant benefit, allowing a hunter to make the quick decision of how to act under high pressure without devoting too much time to prolonged thought [17,19-21]. Therefore, a deficit-based model is the inappropriate way to view ADHD. In a model of ADHD proposed by Arnold et al, "Humans are seen as having innate psychological heterogeneity, with individual differences in cognitive abilities that are a legacy of our evolutionary past," and ADHD is reframed as one equally "normal" facet of that heterogeneity [16]. Individuals only experience ADHD as a disorder when they are restricted or

constrained by the rigid models of the education or workplaces environments of which they are a part.

This is not to say that having ADHD is not difficult for many individuals. Such individuals face higher high school dropout rates, more difficulty performing in the workplace, higher rates of unemployment, and bias by employers and even the judicial system [16,18,22-24]. Many of these challenges arise, however, not because of an innate failing or unfortunate disability on the part of the individual with ADHD. Rather, they arise because the systems in which these individuals participate – their schools and workplaces - are not designed with attention to neurodiversity.

While it may be tempting to continue with the status quo, viewing some neurological traits as innately more "normal" than others, to do so would be an enormous mistake. Many of the largest problems faced by society today would benefit from a wider and more diverse range of minds. The currently untapped potential of engineers with ADHD will be pivotal in solving the multifaceted challenges of the future.

Structure of the NSF REU Site

The program combines a ten-week traditional summer REU research experience with close mentorship, specially designed seminars, workshops, and roundtable discussions to address the strengths and needs of participants. The specific objectives of this REU Site are to:

- Provide an in-depth undergraduate research experience in a project related to cyber or physical infrastructure security while promoting the importance of an interdisciplinary view of security for interconnected, interdependent, and complex infrastructure.
- Promote advances by increasing the number of individuals with interdisciplinary expertise in cyber and physical security of critical infrastructure.
- Promote creativity as an essential component in security-related problem solving by encouraging approaches that are novel, transformative, and multidisciplinary.
- Capitalize on the strengths of an underserved group of students by encouraging students with ADHD to pursue research and advanced study in engineering.
- Increase the participation of a significantly underrepresented group of students who have the potential to profoundly impact the field, but are at high-risk of academic failure.

This year the site hosted nine engineering students, four female and five male. The participants ranged from 18 to 28 years of age and academic standings of sophomores to seniors. Each student was assigned a focused research project in the field of cyber and physical security of critical infrastructure and was mentored by a dedicated faculty and graduate student. In addition to their individual projects, the students participated in afternoon laboratory rotations twice a week for seven weeks to expose them to the multidisciplinary nature of critical infrastructure security problems. Lab rotations were adjusted based on participant feedback from the previous year.

Each Friday afternoon the students participated in either roundtable discussions, brainstorming meetings, seminars, or workshops. These activities were revamped following feedback from

the summer 2015 participants. Roundtable discussions with the Principal Investigator (PI) on helped form an environment of trust and respect which promoted student participation. These discussions focused on creative potential, challenges associated with ADHD, and experiences within engineering programs. Brainstorming meetings and hands on activities allowed students to explore innovative ideas without confining guidelines or rules. These brainstorming sessions and activities had minimal input from the PI or program manager to not hinder the stimulating discussions between the participants Seminars on twice-exceptional education, creativity, and the creative product were included. Workshops were presented on responsible conduct of research and ethics, graduate school, preparing for the GRE exam, and technical writing. The presentation of the seminars and workshops by experts in their respective fields were successful in increasing the participants' self-awareness along with expanding their knowledge of possibilities following undergraduate education.

Role of NSF RET Fellows

The program involved two local K-12 STEM teachers joining the University of Connecticut for six weeks during summer 2016 to work alongside the REU participants. The specific objectives of the RET project component were to:

- Provide an in-depth research experience to two STEM teachers and prepare them to translate their technical experience to their curriculum.
- Increase the teachers' awareness of the profound potential of students with ADHD in engineering and gain knowledge on more effective ways to teach to these students.
- Broaden the impact of the REU project through dissemination of the teachers' experiences.

The teachers joined two different engineering research projects and worked directly with the REU students assigned to the respective projects. This allowed the teachers to observe the students' unique learning styles and capabilities in a research environment. The teachers attended all the workshops, seminars, and round table discussions and individually discussed the pre-college education experiences of each of the participants. This provided the teachers with a unique perspective on the learning diversity of students and the necessity of embracing the creative potential of students with ADHD in pre-college education.

Observations

During this REU experience, we had the opportunity to work with nine undergraduate students in Engineering, all of whom were diagnosed with ADHD. Although all the students shared a keen interest in engineering and have been identified as having ADHD, they were as unique as any group of undergraduates. Diversity was apparent in their backgrounds, attitudes, experiences, and interests within the field of engineering. A striking similarity was their expertise, focus on their tasks, and commitment to working though their individual research and design obstacles. A common struggle they experienced was with the structure of educational environments that did not address their varied learning styles, particularly in introductory college level engineering courses. It was evident from their research projects that these young engineers had found a field of study that was compelling and valuable, to the extent that they were not only able to engage with the material, but to pursue it at a high level.

The students involved discussed having a positive experience for a variety of reasons. Some students expressed appreciation for the comradery of working with other ADHD students in engineering. They expressed that they would often feel judgement from other people who didn't understand the challenges posed by their ADHD. Most claimed to enjoy the discussions about the strengths and potential creativity that may arise from ADHD personality traits that were held weekly, where they could discuss successes and challenges in a non-evaluative context.

For many students, their experiences were highly transformative. One participant shared that he was unhappy with his learning differences, and while highly motivated, often struggled in school. Joining an environment where all the participants shared common struggles made the participants feel less isolated. For many of the participants, this was the first time their ADHD was talked about in a positive light. We observed that this positive reinforcement increased many of the students' self-confidence. Multiple students shared that they felt more empowered to pursue a Master's degree or PhD in engineering.

This program had many strengths that may have contributed to the positive experiences of these students. First, there were many opportunities for mentorship in the program. Students developed individual relationships with the professors and graduate students that ran the projects they worked on. The PI of the site is a successful published engineer and professor who is diagnosed with ADHD, providing a model and mentor for the students on the site. The program manager, an engineering PhD student, provided the undergraduates with coaching and encouragement on their projects, while sharing about her own work. Participants were given freedom, but encouraged and motivated to ask for guidance and feedback when necessary. These mentoring relationships are incredibly important. Research indicates that pairing students with ADHD with a mentor who can help cultivate their strengths can significantly increase student confidence and success [25].

In addition to cultivating relationships and mentorships, the program itself was designed in a way to maximize the abilities of students with ADHD, while minimizing burdens that they might typically face due to their ADHD. This type of thoughtful program design is an example of what the neurodiversity scholar Thomas Armstrong calls "niche construction"[26]. He argues that in a carefully and properly constructed work or school environment, individuals with ADHD or other neurological differences will experience minimal unnecessary strain, and be able to cultivate their strengths. This REU program constructed a niche where students were exposed to many projects and had the flexibility to choose a project of high interest. Students were given freedom with regards to their daily schedules, and were not micromanaged by their PI. At the same time, they were given deadlines to ensure that the major outputs of the project were completed, and received guidance in the forms of templates, group meetings, and email correspondence. Students were not expected to sit in a desk all day, as that is not the nature of engineering research. Students needed to manipulate materials, construct systems, troubleshoot problems, and learn to find solutions. Indeed, research may be more suited to students with ADHD than most other jobs in engineering, which may require a lot of desk time and repetitive tasks. Studies have found that a typical office workplace environment is highly challenging for most individuals with ADHD [16,22]. This program provided a supportive yet unregimented environment, with the freedom to make mistakes and experience the real challenges of

engineering. So often, when we as teachers pose constraints on a project for an engineering task, such as a height requirement, or a maximum length of tape to be used, the constraints are unnecessary or artificial (although not necessarily invaluable). Here, I heard students talking about collecting as much data as possible before a certain device was needed by another lab, or starting an experiment over, because a test sample broke the first time. These are non-artificial challenges that stimulated the often under-stimulated, yet highly intelligent and creative minds of the undergraduates that came to UConn for the summer.

Towards the end of the REU, participants began to share what they hoped for all students in the future, based on their educational experiences. Multiple students urged educators to acknowledge that all learners are important and fondly recalled times throughout their school careers when their strengths were acknowledged and accepted along with needs.

Undeniably, these students are bright, capable and motivated researchers whose greatest stumbling blocks in academia have often been the structures within education, beginning in elementary school. Their final presentations were impressive and the implications of their research span many disciplines within engineering.

Overall, the major observations from this REU Site include:

- Given the right environment (niche), students with ADHD thrive.
- Engineering research can be a stimulating and ideal environment for students with ADHD.
- The opportunity to learn with peers and mentors provided a rich and meaningful experience.
- Students overall grew in their confidence and ability as learners.

Implications of the Observations

As in most systems, optimizing performance of the whole must begin with optimizing the performance of the individual. Working within a strength based model, students who have an awareness and appreciation of their own strengths, have a way to enter and engage in learning activities when they see themselves as valuable, contributing members of the group. Self - efficacy has been shown to be significantly related to students' "choices of activities [including level of challenge], level of effort, persistence, and emotional reactions" [27]. Zimmerman acknowledges the importance of previous research in this area and notes "students' self-beliefs about academic capabilities do play an essential role in their motivation to achieve"[27-31]. The areas influenced by self-efficacy provide opportunities for growth to all students, and are coincidentally potential areas of challenge for students with ADHD. Thus, creating an environment that fosters self-efficacy has tremendous potential for improving overall student achievement, persistence, and a sense of personal and academic well-being.

Aside from the unique qualities that individuals bring to his or her own academic profile, students with ADHD have a variety of assets to offer to the classroom community. These students often exhibit higher than average levels of creativity, are able to generate more original ideas, and are less likely to prematurely end tasks [32]. Giving students opportunities to find

problems, design solutions, and redesign solutions, allows all students to develop the necessary strategies required to promote problem solving, and persistence to a task. Working within a collaborative group, students can, intentionally or unintentionally, have the opportunity to learn from each other, which has been shown to be more effective than teacher student teaching [33].

Teaching students how to work cooperatively, as well as the value of working in purposefully heterogeneous groups, will improve the efficacy of the individuals and the group. As valued members of a group, students with ADHD often exhibit higher than average levels of creativity [32,34-36]. Mind wandering may actually increase creativity and can be an important part of the brainstorming process [37]. Creativity is often, erroneously, referenced only within the arts, yet its development and nurturing is critical to the sciences as well. Unfortunately, rigid curricula, an over-emphasis on standardized testing, and increased identification and medication of students with ADHD all contribute to a decreases within several dimensions of creativity [1].

Creativity and innovation, within a supportive structure, are requisite components for reliably developing solutions to complex problems. This is true at an elementary level, but also as it applies across the learning continuum and eventually, to the workplace [34]. The role of individual creativity is integral to organizational innovation and the highest levels of innovation occur when this relationship is symbiotic [38-41].

Reflections of an Elementary Teacher

Not surprisingly, during this experience, I thought of my elementary students and how the curriculum, my teaching, and even the classroom environment may be helping or hindering them, as potential future scientists. Incorporating an understanding of the neurodiversity that exists in the classroom is critical for teachers, to best deliver instruction, promote independence, foster self-awareness, and promote the learning of all students. Elementary curricula are often heavily weighted in Language Arts and Math, nearly to the exclusion on Science and Social Studies. Over the years, almost twenty now, I have seen the focus change from basals and textbooks, to integrated thematic units, to workshop models. While the workshop model in Reading, Writing, and Math holds promise for individualized learning and opportunities for collaborative group work, I cringe to think of leaving the future of Science, and Engineering in particular, to happenstance or only to the progeny of engineers, simply because there was a lack of exposure to the content and process within this field.

Engineering in the elementary grades is inherently hands-on, engaging, and thought-provoking. It lends itself to collaborative group work, allows different learners to have access to the material, and can be continuously evaluated throughout the processes of planning, execution, and product. The collaborative problem-solving and design components of engineering make it uniquely suited to offer all students the opportunity to develop their creativity, problem solving, and social skills. Typically, engineering courses are not offered until high school or as after school programs at middle school, leaving many students, especially those who struggle with academic and social engagement, out of the process. Talent development in engineering fields can and must begin at the elementary level [42].

What does Engineering look like in the elementary classroom? When it happens, it looks exciting; it's learning that engages all students, addresses different learning styles, helps develop collaborative skills, breeds creativity, inquiry and debate, and teaches content. I have seen my elementary students completely engaged in their forays into the design process:

- Heterogeneously grouped students excitedly discussing how to make an earthquake resistant building
- s out of spaghetti and marshmallows.
- A girl using persuasive rhetoric to convince group members that her idea for a landing pad is the best to keep an egg from breaking.
- A boy who hardly rarely participates, drawing his plan for a second iteration of a design and explaining to his group the benefits of his plan.

You can hear conversations with a purpose, focused on the task at hand.

I lament the lack of time that the elementary curriculum allows to such practical, worthwhile, inquiry-based learning. Neurodiversity and ADHD exist in all classrooms. Elementary students, regardless of their exceptionalities, need to feel that they can succeed at solving complex problems, work together in groups, offer something unique to a project, and develop a lasting love of learning[43]. Research shows the importance of self-efficacy and I have seen it in the classroom [27]. That student who struggles, but has a belief that they will eventually figure out a solution, is continuously motivated and rewarded for his or her persistence. As educators, we tell all the students that they can write a five-paragraph essay; why not tell them they can all design a building that can withstand an earthquake, or that they can write computer code, or invent an original way to solve a problem? Policy makers, administrators, teachers, and parents need to acknowledge the deficits in our systems, not in our students, and actively work to create solutions that promote diversity, encourage equity, and develop innovation and creativity.

Thoughts from a High School Teacher

In my four years of teaching experience at a public high school in Hartford, I have witnessed a number of instances in which students with an ADHD diagnosed were under-served. I have also witnessed the incredible creative and innovative potential of my students with ADHD, and a penchant for engineering tasks that often far surpassed those of my other students.

One of my freshman students, although he was seventeen years old, was well-known for his love of running around in the hallways while he was supposed to be in class. He and I got along most of the time, but his hyperactive behaviors were incredibly challenging to manage in the classroom. One day, I had given my students some insulated wires with alligator clips, light bulbs, and batteries, with a few challenges: Light one bulb up with one battery, come up with two different ways to light up two light bulbs with one battery, and light up one light bulb using two batteries. The activity was exploratory in nature, with students writing and sketching their observations. This student quickly completed all the challenges, and immediately began taking lightbulbs and batteries from the front of the class and other students' desks to add more

lightbulbs, and more batteries into his circuit. He lit up four bulbs, shouting enthusiastically, and then took the back off his friend's phone and began trying to figure out a way to charge it.

While this young man isn't the strongest reader, and his behavior can be challenging, there is no question that he excels when it comes to kinesthetic and mechanical challenges. I wonder how his talent and passion could be celebrated and channeled, rather than smothered. Given his academic record and the fact that he is already two grades behind his peers, I fear that he may not graduate high school. Dropping out is an unfortunately common fate for high-school students with ADHD, much more so then their non-ADHD peers [18,44].

There are many ways that teachers and parents of students with ADHD are told to help those students. Organizational strategies, calendars, mentorship and coaching, flexible seating and mindfulness are all powerful potential tools to help students with ADHD fit into a typical school environment. However, based on my experience working with undergraduate researchers this summer, I believe that proper niche construction in the classroom should be as, if not more, important than these strategies. At the high school level, there is a lot of room for flexibility, especially in the science classroom. As Connecticut and other states move to adopt the Next Generation Science Standards over the next few years [45], districts and teachers have the perfect opportunity to re-look at how we address neurodiversity in the classroom. The NGSS is designed to allow knowledge of content be demonstrated in multiple ways. For example, built into the NGSS curriculum is the explicit statement that "Unless otherwise specified, "descriptions" referenced in the evidence sections could include but are not limited to written, oral, pictorial and kinesthetic descriptions." This explicitly gives teachers and schools the go-ahead to broaden their perspective on how to measure student learning.

My recommendation for high school teachers is that we truly take this statement by the NGSS to heart – while it may be hard for some teachers to let go of the one-size fits all approach to assessing and teaching, there is not only one correct way to demonstrate knowledge and understanding. It is crucial that we incorporate engineering into all science curriculums in an authentic way. Evidence suggests that hands-on, engineering tasks, especially when combined with targeted, clear instruction, improves the academic performance of students with ADHD and learning disabilities [46]. With many of my ADHD students, I have seen the potential of hands-on science and engineering tasks motivating and captivating the attention of even some of the most reluctant students. When I think of my students with ADHD, I wonder how their experience may have been different if I, and their other teachers, had been less rigid about the environment in which we expected them to function.

Conclusions

Based on the premise that neurodiverse students can not only contribute to the betterment of society, but can be the instigators of invention and innovation, the authors recognize a fundamental need for educators to be aware and supportive of the unique nature of all learners. Furthermore, educators should approach teaching from a strengths focused methodology, not a deficit model [14]. Acknowledging the existence of negative bias toward students with ADHD will allow educators and peers to reframe their interactions [9-12,19]. Within the context of reframing perceptions of students with ADHD, the need exists to move from the idea of 'accommodating'

for some, to differentiating for all. Employing a different approach to planning meaningful lessons and activities that support all learners' contributions, necessarily implies utilization of more diverse evaluation methods, as well as teaching strategies. The uniquely attractive components of engineering, i.e., real world applications, the design process, and creative problem-solving through hands-on activities, are uniquely able to capture the curiosity and imagination of young students.

The experiences of the participants over the last two summers is a clear indication of the unique capabilities of students with ADHD and their aptitude for engineering. Working closely with mentors who view their differences as assets rather than burdens increases the students' motivation and self-confidence.

This REU Site will be continued at the University of Connecticut during summer 2017. In addition, the PI received an NSF CAREER Award: Promoting Engineering Innovation Through Increased Neurodiversity by Encouraging the Participation of Students with ADHD. This award, which began in January 2017, aims to further encourage a paradigm shift in how neurodiverse individuals are perceived, by both society and education programs.

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