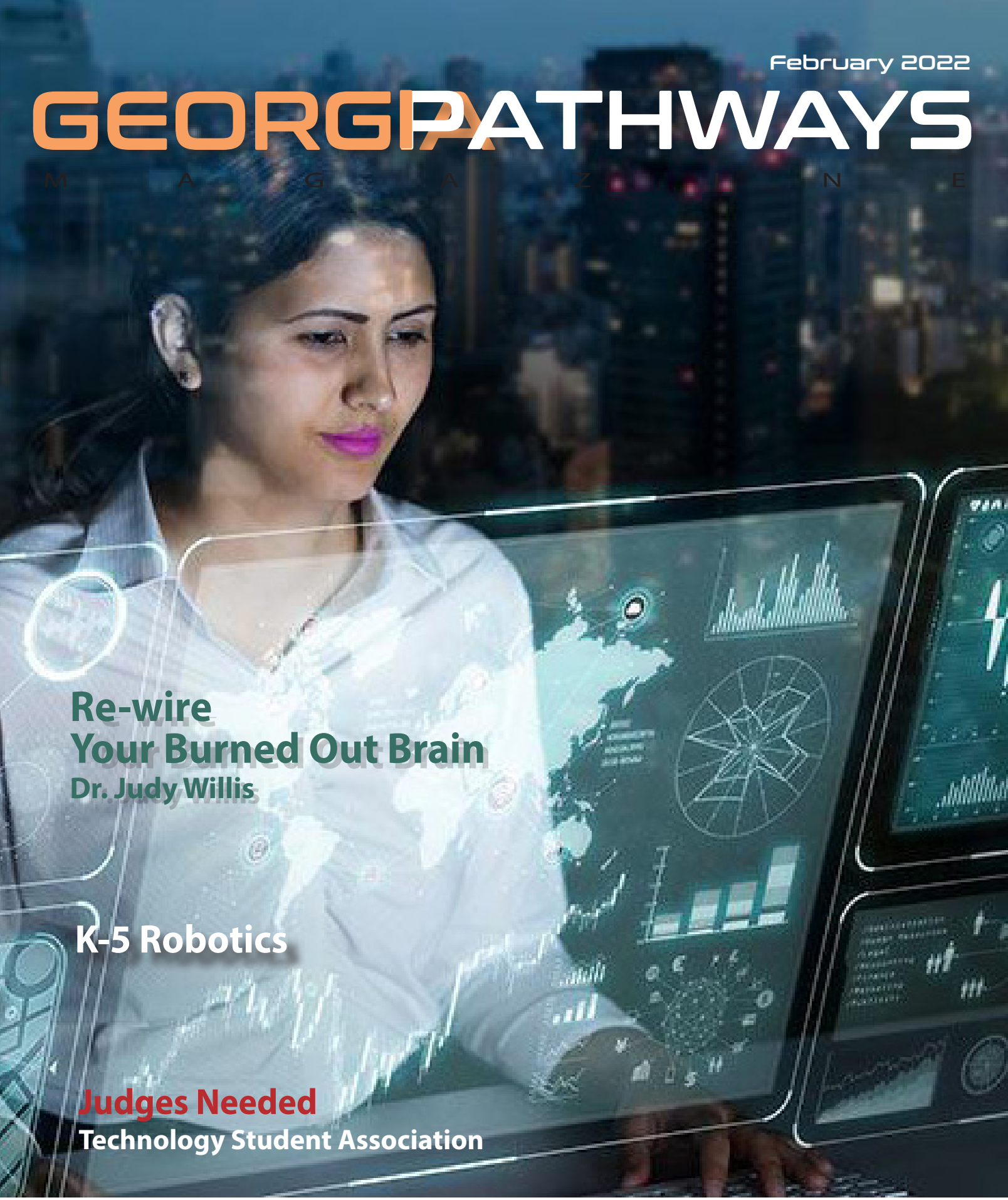
February 2022

GEORGIA PATHWAYS

MAGAZINE



Re-wire Your Burned Out Brain

Dr. Judy Willis

K-5 Robotics

Judges Needed

Technology Student Association

TAG Technology Association of Georgia

TAG TAG-Ed Education Collaborative

The Technology Association of Georgia Education Collaborative (TAG-Ed) strengthens the future workforce by providing students with relevant, hands-on STEM learning opportunities and connecting them to Technology Association of Georgia (TAG) resources. Formerly the TAG Foundation, TAG-Ed is a 501(C)(3) non-profit organization formed by TAG in 2000. Later, the organization's name was re-branded to TAG Education Collaborative to facilitate our role as the leaders for K-12 STEM education in Georgia.

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The innovation economy runs on brainpower and our supply of talented people needed to fuel that innovation is getting low. As technology leads the economic recovery, our tech talent gap continues to widen.

"The demand for IT talent has never been higher," according to a new report by Marietta-based Softensity. "Tech job postings are up 39 percent over 2020. Companies are doubling down on emerging technologies that shine a spotlight on the growing skills gap.

By taking the right steps now, we can create a workforce that matches the job skills of the future and fuels sustainable growth and a higher standard of living. Here is where we can start:

1) Support STEM education: By investing in STEM education, we are sparking interest and providing skills our youth need to set them on essential career paths.

2) Invest in training and up-skilling: Digital technology is changing how we work and interact with each other. How we adapt to these new conditions in the workplace is vital to everyones success.

3) This year, TAG-Ed started hosting talent acquisition open houses on the third Thursday of every month. This is one way for TAG member companies to have open conversations with interested job candidates, giving them first hand access to their future workplace and gaining valuable insights into expectations and needed development.

4) Groom the next generation of tech leaders: Our new TAG program, Pathways to Leadership, or P2L, is geared to elevating the careers of high-performing, up-and-coming leaders.

It's a way for companies to invest in their most powerful competitive advantage: people. Employers gain a unique opportunity to develop the next generation of technology leaders, and participants learn directly from industry experts through open discussion sessions and hands-on projects. TAG-Ed begins accepting applications for the 2022-2023 P2L cohort March 1st.

5) Open opportunities in underserved communities: I believe inclusion drives innovation, just as innovation drives inclusion. Connecting people in underrepresented talent pools with job opportunities is a win for everyone. Through TAG-Ed, we work with businesses to support tech training and apprenticeships for employees who would not otherwise have access to these programs. Inclusion must be our priority.

The possibilities of the innovation economy are boundless, but to achieve our potential, we must include everyone--from students in underserved communities, to employees seeking up-skilling and career development. TAG and TAG-Ed continue to be committed to these efforts.

Larry K. Williams
President
TAG / TAG-Ed

Larry K. Williams serves as the President and CEO of the Technology Association of Georgia (TAG) and President of the TAG Education Collaborative (TAG-Ed). TAG-Ed's mission is to strengthen Georgia's future workforce by providing students with relevant, hands-on STEM learning opportunities by connecting Technology Association of Georgia (TAG) resources with leading STEM education initiatives.

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CYBERWARRIOR FOUNDATION
CyberWarrior.org/diversity

WORKFORCE DIVERSITY PROGRAM

The CyberWarrior Foundation, in partnership with the Security & Infrastructure Security Agency (CISA), is creating high-wage career opportunities for historically underrepresented communities, including the underserved, women, veterans, and underemployed individuals.

Our mission is to bridge the technology skills and diversity gaps by providing cybersecurity training, employment opportunities, and transitional support necessary for people to gain the knowledge, skills, and abilities for career opportunities and growth. We understand that strength lies in differences, not in similarities, so diversity is our core value, and we actively promote it through the cybersecurity industry.

Our Cybersecurity Workforce Development and Training Program for Underserved Communities, in coordination with the Department of Homeland Security and CISA, serves people from the Northeast (CISA Region #1) and the Southeast (CISA Region #4).

If you are from a state on one of the following maps, visit cyberwarrior.org/diversity for more information.

BOOTCAMP PROGRAM OVERVIEW

CyberWarrior has developed a training that brings together vocational lab-driven exercises delivered by ethical hackers and industry experts, combined with the hands-on knowledge, tools, and certifications necessary to launch a career in cybersecurity. Further, the content was built using the National Institute of Standards and Technology (NIST) framework and mapped to the National Initiative for Cybersecurity Education (NICE).

CLASSROOM AND LAB TRAINING

4	800	28	7
national recognized certifications	Hours	weeks	proprietary technical courses

INDUSTRY-RECOGNIZED CERTIFICATIONS + PROPRIETARY TECHNICAL COURSES

- CompTIA Network+
- CompTIA Security+
- EC-Council Certified Ethical Hacker (CEH)
- EC-Council Certified Network Defender (CND)
- Malware Analysis
- Incident Response
- Security Automation
- Firewalls and IDPS
- Vulnerability Management
- Package Analysis
- Security Monitoring

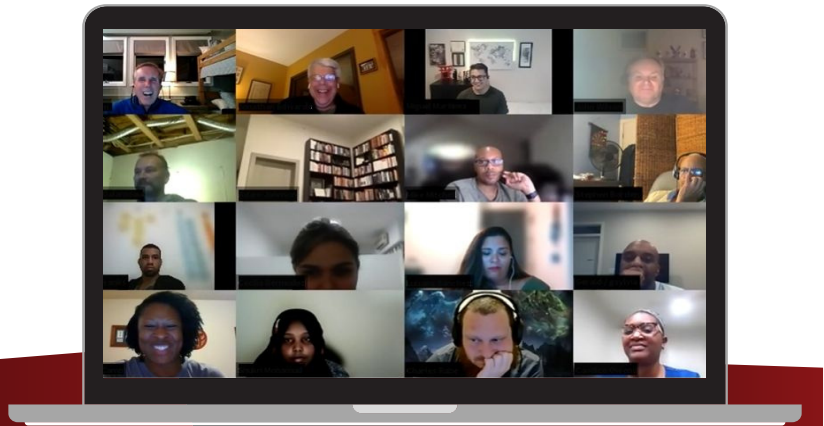
Our students have the opportunity to receive 27 college credits, making CyberWarrior Cybersecurity Bootcamp the most comprehensive cybersecurity program today.

Our innovative Career Hacks course delivers the soft skills to engage in the “business” of cybersecurity. Moreover, CyberWarrior exclusively connects the students with industry practitioners (recognized CISOs, security directors, and more) to share real-world experiences, “a day in the life” of a Cybersecurity professional, what the student should expect upon graduation, and receive personal mentorship each week.

DELIVERY METHODOLOGY

CyberWarrior’s curriculum is refined for online learning and is purposely dynamic to meet the evolving needs of our employer partners. Our model includes 4-hour online classes with live instructors, quizzes, and hands-on labs, in individual and group settings. Instructors are experts who can give real examples of our content’s relevance during an attack.

Launch your cybersecurity career in just six months. To learn more, visit us at CyberWarrior.org/diversity.



Georgia STEM Day 2022

March 4th

Learn More

Georgia State Announces New RISE Challenge to Fund Transformative Research

Andrea Jones
Vice President
Public Relations and Marketing \Communications

Georgia State University will launch a new Research Innovation and Scholarly Excellence (RISE) challenge to address complex societal problems through interdisciplinary collaboration.

The initiative aims to foster an innovative research ecosystem at the university and leverage the strengths of the Georgia State research community to address complex problems.

Georgia State President M. Brian Blake announced a $2.5 million one-time investment to jump-start up to five research projects as part of the initiative.

"Georgia State's research and innovation are so important to the state, region and world," Blake said. "The RISE challenge will provide resources for teams to develop even more transformative research at the university and help cultivate the next generation of innovative thought leaders."

The RISE challenge will be led by Georgia State Vice President for Research and Economic Development Tim Denning and Interim Provost and Senior Vice President for Academic Affairs Nicolle Parsons-Pollard.

The RISE initiative will provide resources for five interdisciplinary teams of faculty to develop transformative research at the university. Teams that receive these awards will take bold new approaches to our most pressing societal challenges.

Their signature research themes will culminate in large-scale impacts within the university and beyond through partnerships with government agencies, private industry, foundations/nonprofits or philanthropic sponsors. This challenge will cultivate the next generation of innovative thought leaders among our faculty, staff and students and truly make Georgia State RISE!

The goals of the initiative are to:

- Identify five interdisciplinary research areas in which Georgia State is uniquely positioned to establish itself as a national / international leader.
- Stimulate the formation of effective and productive research teams addressing the most pressing challenges facing society.
- Elevate the university's visibility in these interdisciplinary research foci and other areas of unique strength.
- Provide invigorating new opportunities for faculty, staff and students.
- Facilitate large-scale awards (federal, state, foundation/non-profits, industry, etc.) and/or sustainable partnerships.

"Through the RISE challenge, Georgia State is extending its work in interdisciplinary research and scholarship into its next phase," said Parsons-Pollard. "This initiative takes the firm foundations of previous efforts that looked externally and applies this spirit and the lessons learned toward harnessing the university's unique, existing strengths in exciting new directions while enriching and growing our faculty toward new research goals.

While the RISE challenge looks to internal strengths, it also has a major external

component, as successful teams will be charged with proactively engaging students and the larger community outside of Georgia State."

RISE teams will receive one-time seed funding of up to $500,000 over the course of one year. Recipients will be notified May 16. The teams will be expected to take new approaches to some of today's most pressing societal challenges.

"Over the past decade, Georgia State has risen as a dynamic research institution, and the university is now poised to build on that growth. This initiative is about accelerating interdisciplinary research and innovative thinking," said Denning. "We are excited to bring together Georgia State's research community to meet some of society's toughest challenges and produce tremendous outcomes."

https://ursa.research.gsu.edu/rise/

The VINE

November 3, 2022

TAG-Ed's annual wine tasting and auction benefiting STEM education and workforce development.

Thursday, November 3rd, 6pm

Park Tavern Garden Tent and Meadow

500 10th St. NE, Atlanta, GA, 30309

Become a sponsor or purchase tickets today

For questions or more information: heather@tagonline.org

TAG | TAG-Ed Education Collaborative

Judges Needed

It is time to prepare for another TSA State Leadership Conference and we are very excited that it will be in person. It is our hope that you will join us for this important student leadership event!

On March 16-19, 2022, the Georgia Technology Student Association (TSA) will be hosting its State Leadership Conference at the Classic Center in Athens. Conference activities will look somewhat different, and the CDC guidelines will be followed to maintain the health and safety of our students, teachers, alumni, volunteers and staff. What remains the same is that we will need lots of volunteers in order to successfully serve our amazing students. Important conference logistics:

- Approximately 75 judges will be needed pre-conference to judge online entries, beginning February 28th.

- Approximately 200 volunteers will be needed to serve as onsite judges on Thursday, March 17th and Friday, March 18th.

- Each competitive event session requires approximately 4 hours and volunteers can certainly serve in more than one session if your schedule permits.

- Many events have two phases, and it is very helpful to have the same team of volunteers serve in both the morning and afternoon sessions for these events.

Please review your 2022 calendar and complete the **Judges Registration Form** if you are able to volunteer to judge virtually and/or in-person.

If you need hotel accommodations for the in-person conference, you can access the housing registration site via this **Housing Link.**

If you have questions about this event, please contact the TSA Judges Coordinator at judges4education@yahoo.com.
To Find out more about Georgia TSA click here - **https://www.gatsa.org/**

ROBOTICS IN THE K-5 CLASSROOM

By Stan Hickory

The world of automation

I recently had a conversation with someone outside of education. I asked him what he thought should change with our current education system and his reply was, "When I was in High School, most everyone took auto shop and learned to tear down and rebuild a car. Why don't we do that with computers, robots, and networks - the fundamental technologies of our age?

Why isn't programming required like math?"

I walked into a McDonald's the other day. There were seventeen people in line ahead of me. I was standing next to a touch-screen ordering kiosk and was intrigued by this new technology. How much faster could it be? I placed my order and watched. After the cashier had taken the fourth order, my breakfast was delivered to the counter. "That was fast, I thought. "How long will it be before everything behind that counter is automated?"

In an article in the Tampa Bay Business Journal, Hubertus Muehlhaeuser, CEO of Welbilt, was quoted, "I envision, within a year or two, people ordering their food by cell phone before they reach a restaurant. The order will go directly to the relevant appliance, which grabs the food, starts cooking it at the time dictated by the customer's distance from the restaurant when they placed the order, and packages just in time when the customer arrives,."

A USA Today article reported on "Flippy," a burger robot at Cali Burger in Pasadena, California. Flippy can cook 2000 burgers a day. According the Bureau of Labor Statistics, there are 3.4 million jobs in the food serving and preparation industry.

Consider Amazon Go. In 2017, Amazon opened its first cashier-less store in Seattle, Washington. A customer walks into the store, gathers the items she wants to purchase, and an app on her phone identifies and charges her for the items on her way out. According to the Bureau of Labor Statistics, that's another 3.5 million jobs being replaced by automation. The Bureau has also calculated there are 3.5 million jobs in the trucking industry. These too will be lost to automation. That is over 10 million jobs that will be automated in the next five to seven years.

The top 10 most in demand jobs in 2010 did not exist in 2004 . In a 2018 report on the state of cybersecurity jobs by ISACA, there will be 6 million cybersecurity jobs and a global shortage of two million cybersecurity professionals by 2023 .

There is a call for robotics and programing in the primary years. It is paramount that we add robotics and programming to the K-5 curriculum. It is common knowledge that teaching a foreign language in the primary grades yields a stronger understanding of languages in general. This can be applied to programming as well. "Learning programming has similarities to learning languages, because each programming language is a different language. So exposing children to the concepts that are similar across coding languages at a young age makes it much easier for them to learn and use these skills as they progress through life," says Lindsay Craig, founder of Questbotics,

an educational robotics and programming company based in Longmont, Colorado. In addition, Mr. Craig explains that, "Technology is constantly evolving, introducing kids to the fundamentals at a young age means that they have a chance of keeping up with the advancements in the field as they grow older and start to use the tools of their chosen industry. And, advanced robotics is just plain difficult. If the skills are introduced at a young age as fun and approachable then students have a better chance of developing their abilities to reach the more difficult stages later in life."

The interest in robotics at early ages is massive. I spoke with Dennis Kambiets, Director of Education at Robots Education. "We've demonstrated robotics to more than 12,000 students from grades 4-12, and we'll average 90% of students wanting to learn robotics in middle school, and about 60% in high school, as compared to the national average of 2% for boys and .2% for girls. But most importantly, we've seen almost 100% interest at the primary level." We need to feed this passion to address this dramatic drop in interest as students move from primary, to middle, and on to high school. This trend can be changed if we were to integrate robotics and programming into the K-5 curriculum.

Does this mean we are going to increase screen time for K-5 learners? Not necessarily. Questbotic's, Lindsay Craig, has an approach to teaching robotics that starts without screen time. "At a young age I teach without using screens. That means using hands-on robots, physical activities and discussions...Working on a screen doesn't nurture the soft skills that are so important in society and the workplace.

The real world also presents hurdles that are at the core of robotics. In a controlled environment, such as inside a screen, students don't learn how to handle the problems that arise from trying to manipulate reality using robotics. Their goals, resources and methods are also limited to the system in which they are working. The real world puts no such limitations on problem solving and dream pursuing."

How will Robotics and programming prepare our students?

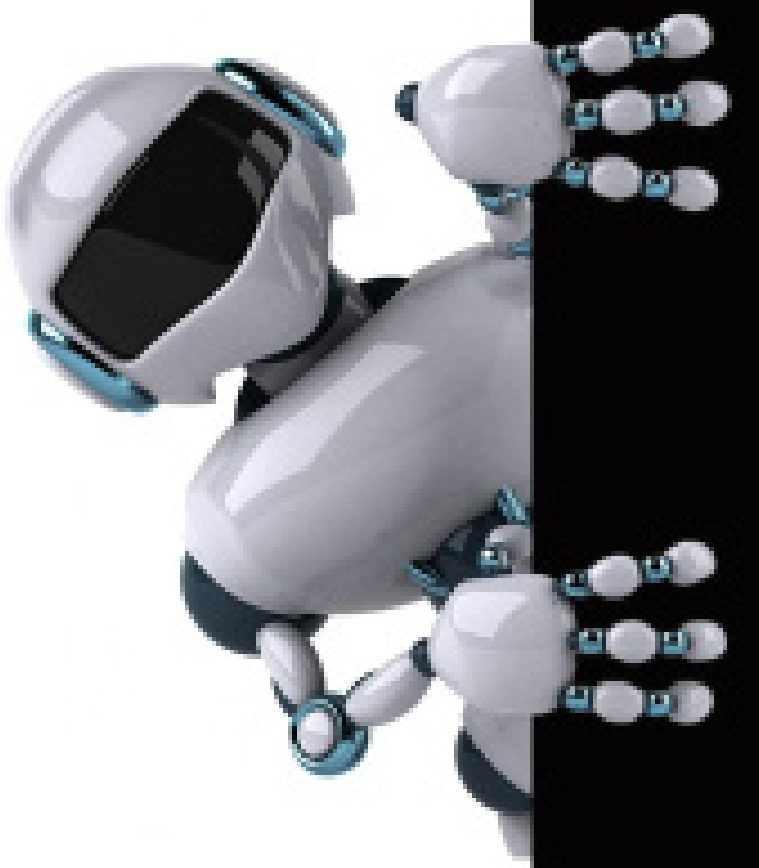
Robotics and coding provide a vehicle for teaching perseverance, problem-solving, collaboration, critical thinking, and creativity. The very act of coding a robot is an exercise in problem-solving. How does one make a robot do a particular task? Students will go through a system of trial and error to program a robot.

Unless the code is written perfectly, the robot will not move - and rarely is the code written correctly the first (or second) time around. This process also teaches perseverance and critical thinking. Finally, collaboration is a skill that will be developed as students work together to make the robot perform.

In a conversation with John Blankenship, founder and owner of RobotBasic, he expressed why we need to teach coding. "Programming is one of the best ways to teach problem solving, mathematics, and analytical thinking. Programming is motivational because it can be used to address realistic and interesting problems, especially through simulations. It is a valuable teaching tool because it provides instant feedback in many situations." I have seen this in action in one classroom that I observed. Students were tackling the difficult problem of bullying in our school by creating an application for kids to use to report bullies. They created a prototype and took it live with one classroom. This provided instant feedback on their application. They were able to use the feedback to improve the functionality of the application the very next day.

Our students will be going into what is called a "Gig" economy. This means most jobs are short term contracts and the most successful people will be able to identify problems for a businesses and then provide the solutions.

Steven Reinharz, President of Robotics Assistance Devices, in Orange County, California, says, "Robotics is an open area where people can create whatever they want to solve whatever problems they see. . . it's about creativity."



I know of one school where students are using programming to do this. They were

unhappy with the number of choices on the school's lunch menu and the amount of food being thrown out each day. Students created an application to manage pre-ordering of meals so the cafeteria knows exactly how many lunches to prepare.

This type of problem-identification and problem solving enhances the skills necessary for our students to be successful in the rapidly changing job market. Soon, we will walk into a McDonald's and see an entirely automated system; from taking an order, to flipping the burger, to getting it into the customer's hands.

But, there is still the need for people identify problems and build robots and program software to solve programs. The sooner teachers can introduce this technology the better off our students will be. The key is to understand that robotics and programming does not have to be a separate, stand-alone class.

Rather, it can be used to enhance learning and problem solving in all areas of the curriculum. There are countless companies popping up that provide robotics hardware, software, curriculum, and professional development. If you would like more information on how to get robotics into the classroom, you can contact me at www.linked.com/in/stanhickory.

Margie Maning, "Here's what the next generation of the fast-food industry looks like to this Tampa Bay CEO", https://goo.gl/zVhbej, (May9, 2018).
Bureau of Labor and Statistics, https://goo.gl/6HN3of (accessed June 1, 2018).
"We are living in Exponential Times", Ivy College, https://goo.gl/8ZhK4K (accessed June 1, 2018).
Steve Morgan, The Cybersecurity Jobs Report: 2017 Edition, https://goo.gl/oJpkyg (May, 31, 2017).

Stan Hickory has been in education for over 20 years. Stan worked in the K-12 system as a Social Studies, English, Design Thinking, Environmental and Spatial Technology teacher.

Stan has also been the Executive Director of the non-profit, Trek To Learn, a educational travel organization.

Georgia Pathways Magazine ***is not*** designed for just STEM teachers.

No matter what you teach, from basketball to physics, this magazine is for you and your students.

Review and use the resources. Stimulate your own creativity.

Forward it to your students and their parents...unlimited.
Make this a new connection for curiosity and interaction.

Every subject uses STEM skills.

Submit an article: wayne@tagonline.org

Dr *Judy* Willis
Neurologist

How to Rewire Your **Burned Out** Brain:

Tips from a Neurologist

"For teachers, students....anyone with a brain."

The school year will be over before you know it, and with it comes a likely drop in the stressors that build up and promote teacher (and student) burnout. For those of us who don't get a summer vacation, this content is doubly important. Under our current work and social circumstances, it is therefore timely to suggest interventions to prevent or reduce burnout.

However, it is often not until we are away from a high-stress situation for a while that the brain can move out of reactive survival mode and into a relaxed state where it can ponder the big picture.

The burnout interventions I am about to suggest are likely to be ones that you already know. The problem is, when it comes to adding another activity to your schedule, past experiences may have left you with the expectation that there is not enough time -- or you've tried things like this before and didn't notice any change.

So you stopped.

My belief is that when you understand what happened in your brain to build up the hopelessness and frustration of burnout, you'll connect with the logic of the interventions. Then, with the addition of the video game model to the boost the neurochemical benefits of the activity of your choice, you'll literally de-construct the resistance network your brain constructed, and reset your circuits of confidence and motivation.

Know It's Not Your Fault

Teachers often blame themselves for problematic student behavior, failure to "cover" every standard, and not differentiating instruction to suit the needs of each student. Know that you are not alone, but part of a growing majority of educators questioning their abilities to continue teaching. You are teaching at a time when it takes profound commitment and creativity to meet expectations. There is pressure to teach excessive quantities of information and differentiate instruction

to meet the needs of all students -- yet the supporting resources needed are dwindling.

Burnout feelings are not a reflection of your teaching skills or professional abilities. Those who question their ability to do their jobs properly are often among those who hold themselves to the highest standards. They also put in the greatest effort. When they must deal with external forces -- beyond their control;
-- that limit their ability to attain their goals, self-doubt builds, confidence drops and burnout sets in.

If you're burned out, your brain has rewired to -

Survival Mode

What I offer from the nexus of my dual careers as a neurologist and classroom teacher are interpretations and correlations from the neuroscience research to teaching and learning. Neuroimaging studies reveal the metabolic changes in regions of the brain where activity increases or decreases in response to emotional or sensory input.

There are specific and reproducible patterns of changing neural activity and brain structures associated with stress. In the high-stress state, subject's scans reveal less activity in the higher, reflective brain and more activity in the lower, reactive brain that directs involuntary behaviors and emotional responses.

Prolonged stress correlates with structural increases in the density and speed of the neuron-to-neuron connections in the emotion-driven re active networks of the lower brain, and corresponding decreased connections in prefrontal cortex conscious control centers.

The explanation of these changes is generally attributed to the brain's neuroplasticity of "neurons that fire together, wire together." The brain literally rewires to be more efficient in conducting information through the circuits that are most frequently activated. As you internalize your thwarted efforts to achieve your goals and interpret them as personal failure, your self-doubt and stress activate and strengthen your brain's involuntary, reactive neural networks. As these circuits become the automatic go-to networks, the brain is less successful in problem-solving and emotional control.

When problems arise that previously would have been evaluated by the higher brain's reasoning, the dominant networks in the lower brain usurps control.

The good news is that you can apply what you now understand about your brain's survival mode to take back voluntary control of your choices. You can activate the same neuroplasticity that gave dominance to the lower brain networks in the burnout state to construct a new, stronger default response. With more successful experiences achieving goals, you can reset the circuits that will direct your brain to access its highest cognitive resources for creative problem-solving.

You can build up new, improved circuitry, switching your responses from retreat to IGNITE! Since a repeated pattern of effort-failure set up the brain's survival response to withhold effort, you'll need to strengthen the pattern of effort toward goals can result in success. Your weapon of mass reconstruction can come from your brain's very powerful drive for its own neurochemistry -- dopamine and the pleasure it brings.

The plan to guide you comes from the video game model that works because of three components: buy-in, achievable challenges, and frequent awareness of incremental progress en route to the final goal.

Reset Your Brain's Default Neural Network from Retreat to IGNITE!

See these resources for a full description of the video game model:

- A Neurologist Makes the Case for the Video Game Model as a Learning Tool

- How to Plan Instruction Using the Video Game Model

The fuel that motivates the brain to persevere through increasing challenge, even through failed attempts, is dopamine. This neurochemical produces the pleasure of intrinsic satisfaction, and increases motivation, curiosity, perseverance and memory. Dopamine is released when the brain makes a prediction or achieves a challenge and gets the feedback that it was correct. This can be in situations from the "Ah, I get it!" of figuring out a joke to the satisfaction of completing a marathon.

Just as the video game model can be applied to building a growth mindset in students, the same model can help rewire your mindset regarding your ability to achieve teaching goals at school. As in the video game model, to get the dopamine-pleasure response from challenges achieved, you'll need to plan for your brain to experience frequent recognition feedback of incremental progress.

You should set your "rewiring" goals by their desirability and by the goals' suitability to be broken down into clear segments.

This way, you can chart your goal progress as you achieve each stepwise challenge. The pleasure burst of intrinsic motivation that will accompany your recognition of each progressive increment achieved in the goal pathway will keep your brain motivated to persevere.

Goal: Buy-In for Your Brain's Neural REWIRING

Buy-in and relevance are important in choosing your rewiring goal. Since your goal is to rewire your brain's expectations that your efforts will yield progress, even through increasing challenge, you need to really want the goal. This is not the time to challenge yourself with something you feel you should do but won't really look forward to doing, such as dieting, climbing stadium stairs, or flossing after every meal. Select a goal that you would enjoy en route and at the finish.

Usually goals are tangible. Some are visible, such as planting a garden or making pottery on a wheel. Others are auditory, such as playing an instrument, or physical, such as learning tai chi. But your goal can also be the increased amount of time you sustain an activity such as journaling, practicing yoga or sketching.

Sample "Rewiring" Goals
You'll find your own goal for buy-in, but here are some examples to give you a sense for how to structure your new goals.

Physical Goals

Notice I didn't say exercise. That's not as motivating as "training" for a physical goal you want to achieve, even though they often overlap. If you want to run a 10K, and if you enjoy running, the goal for achievable challenge could be first building up to the distance starting with the baseline distance you comfortably run now. Then plot out the increments that you'll consider progressive successes, such as adding 5K a day or a week.

The increments will depend on what you consider both challenging and achievable. Once you reach 10K, speed can become the next goal, again plotted out in segments of incremental progress before you start.

"Repeated effort-reward experiences promote neuroplasticity."

Archery?

Possibly after seeing The Hunger Games, archery has new appeal. Again, plan your stepwise achievable challenge increments. Start with a home dartboard (a low initial investment) and throw from a close but challenging distance. As you get better in accuracy, move farther back. Record your results, noting the distance of each im-

provement you set as an achievable challenge. If you get so good that the dartboard no longer challenges you, try that archery!

Learn a Language

Try this one only if the ***buy-in*** is strong enough, such as definite plans to go to a country where the language is spoken.

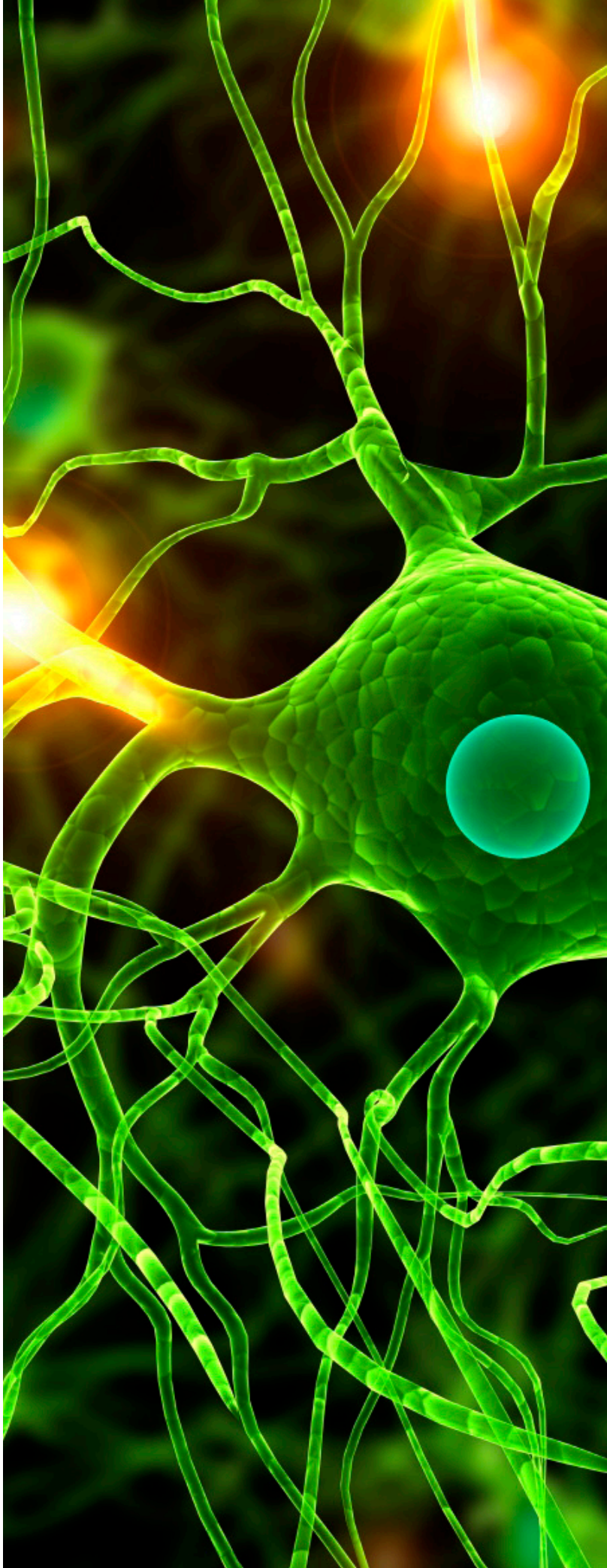
Videography / Photography

If it appeals to you to make high quality videos or PowerPoints using advanced computer software, go for an early success, such as the videos you can make on www.animoto.com.

Repeated effort-reward experiences promote neuroplasticity, and this makes a neural network that expects positive outcomes into your new default network. This is because your "rewiring" goals helped your brain build stronger and more connections into a memory pattern where effort brings pleasure.

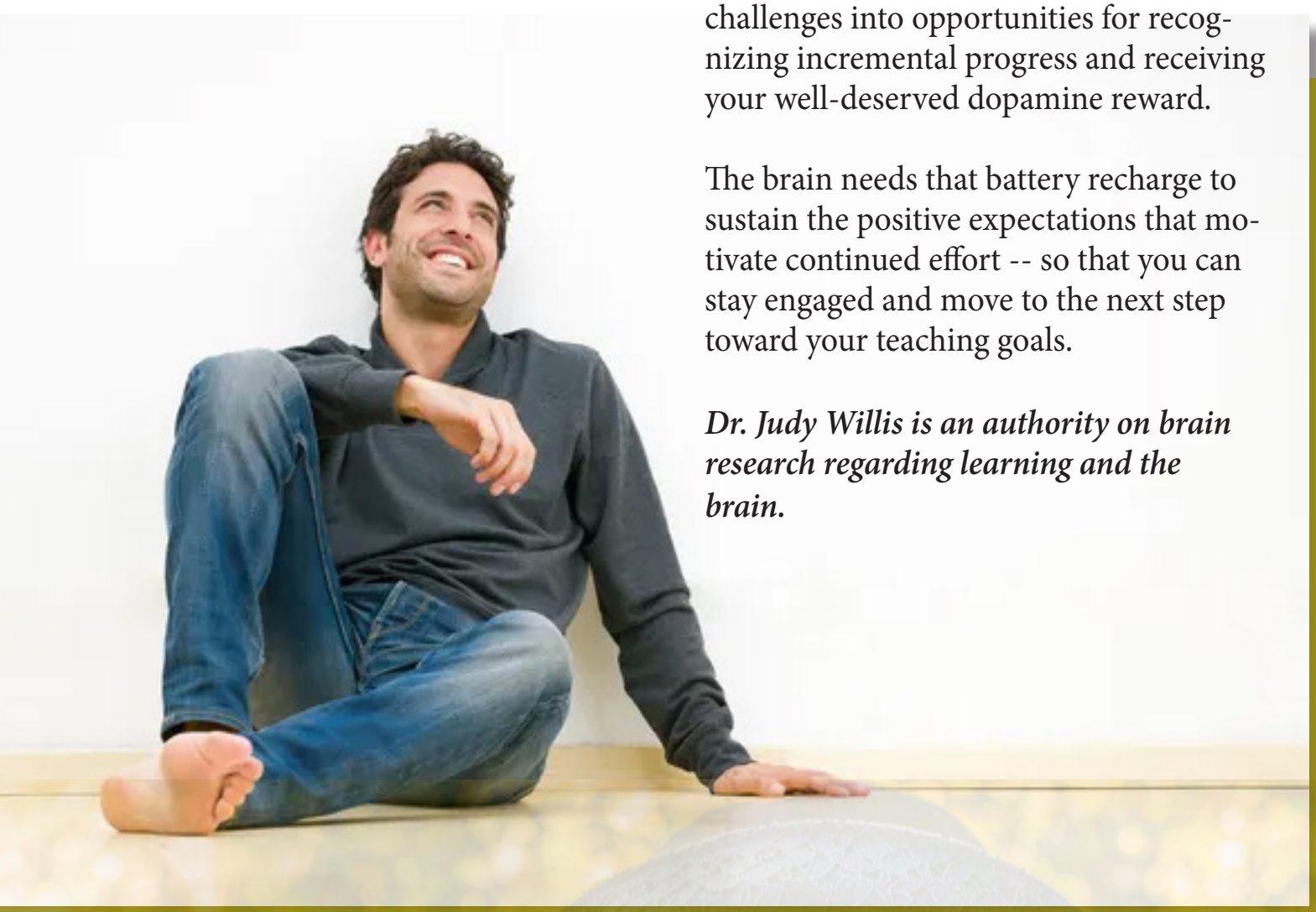
As with other networks not used, the previous lower brain stress-activated go-to response network you developed, the one that caused you to react to problems, will be pruned away from disuse. You'll be rewired with optimism and renew your positive expectations.

With your higher, reflective brain back in control, you'll be able to access your perseverance, innovation and creative problem-solving when you return to work or



the classroom. Just be sure you take time to recognize each small success and creative problem-solving opportunity.

Keep up the habit of breaking down big challenges into opportunities for recognizing incremental progress and receiving your well-deserved dopamine reward.



The brain needs that battery recharge to sustain the positive expectations that motivate continued effort -- so that you can stay engaged and move to the next step toward your teaching goals.

Dr. Judy Willis is an authority on brain research regarding learning and the brain.

“Music training before the age of seven has been found to have a significant positive impact on brain development”

STEM CAREERS?

According to Georgia Colleges and Universities, these are some of their STEM Degrees currently offered.

Not a day goes by that I don't have a conversation with an educator, administrator, student or parent who questions just what a STEM career is. Media attention continues to focus of the obvious; aerospace, scientist, engineer (vague), or math person of some kind.

STEM Magazine continues to strive to clarify the broad scope and varying depths of STEM careers and the skills necessary to perform those.

As you glance over this short list, you'll see surprising and important roles not usually associated with the general perception of STEM careers...but non the less, these are STEM careers requiring STEM skills.

Keep in mind this is only one state, but surely represents our nation's needs. There are of course many more STEM careers of various education levels that currently may not have a Bachelors Degree available, but are still considered STEM Careers.

"Don't ask me, ask the Universities and Corporations that will hire our students".

I know this is a long list, so I've taken to opportunity to arrange them in an unconventional order to get your attention and continue our pursuit of better understand a "real" STEM career.

According to a variety of Georgia Colleges and Universities, these are their offerings for STEM degrees.

Archivists
Preserve documents and records that are historically significant.

Cartographers and Photogrammetrists
Collect, analyze, and interpret geographic information to study and prepare maps.

Geography Teachers
Teach college-level courses in geography.

History Teachers
Teach college-level courses in human history.

Political Science Teachers
Teach courses in political science.

College Vocational Education Teachers
Teach vocational or occupational subjects at the college level.

Cost Estimators
Prepare cost estimates for a variety of projects.

Curators
Oversee collections, such as artwork, collectibles, and historic items.

Dietetic Technicians
Help to provide food service and nutritional programs, under the supervision of a dietitian.

Dietitians and Nutritionists
Advise people on what to eat in order to lead a healthy lifestyle or reach a specific health goal.

Economists
Study monetary, fiscal, and other economic issues and problems.

Epidemiologists
Investigate the causes of health problems in communities or societies.

Geographers
Study the earth and its land, features, and inhabitants.

Historians
Research and understand the past by studying a variety of historical documents and sources.

Hydrologists
Study water that is underground or at the surface of the earth.

Market Research Analysts
Gather information to determine how much demand there is for a product or service in an area.

Non-Destructive Testing Specialists
Test the safety of various types of structures using x-ray, ultrasound, or fiber optic equipment.

Sociologist is a STEM career

Study the behavior of people in groups. The science (systematic accumulation of knowledge) of collecting group data.

Park Naturalists
Plan and conduct programs to educate the public about national, state, or local parks.

Quality Control Analysts
Conduct tests to study the quality of raw materials or finished products.

Sociologists
Study the behavior of people in groups.

Statisticians (our greatest current need)
Create usable information out of numbers and data.

Survey Researchers
Develop or conduct telephone, mail, or Internet surveys.

Technical Writers
Explain technical information through charts and manuals.

There are so many more career opportunities that require STEM skills for both women and men. Just when you thought you knew STEM....

There is not a shortage of Engineers

by Wayne Carley

This is technically true and false at the same time. For everyone who thinks we need to encourage our students to pursue engineering, please do them a huge favor and ***be specific***.

Engineering is not a career or a singular degree, but rather a broad category of dozens of diverse careers and degrees that are usually very different from one another both in education and daily practice. To simply say "we need more engineers" is not only inaccurate but uninformed and far too vague to grab the interest of our students who often think engineering is scary and hard.

When a student says "I'm not interested in Engineering", it's because we have failed to educate them about the specifics and amazing diversity of engineering fields. The old class project of building Popsicle stick bridges to introduce engineering does little to attract "real" lasting interest and is far too shallow to do the fields justice.

If you were asked, could you tell your students what type of engineering is related to bridges? Just in case, the answer is Civil Engineering.

However, Civil Engineers don't actually physically build bridges and rarely "touch" the construction portion of the build. They usually work in offices creating designs and structural plans. They are also needed to work at constructions sites from time to time to monitor workers and troubleshoot. Remember, engineers are "problem solvers".

About 48 percent of civil engineers work in engineering and architectural firms.

If your students want to actually build bridges, they need to look at construction careers with daily hands-on bolts, steel, welding and physical labor. That's really bridge building and is a STEM job too, but very different from engineering in education and day to day responsibilities. Students need to know as many details as possible about what the career of interest really does, not just what they have heard, think or seen on T.V.

"Engineers are problem solvers more than anything else."

As a nation we do not have a general shortage of "engineers", but rather a lack of engineering talent in several different ***specific*** fields of engineering.

Once again, being specific is very important because ***what we need today may not be what we need 10 years from now*** and our students need to have as complete an understanding as possible of the career field being considered. Currently there are only 123,390 engineering jobs listed with the U.S. Bureau of Labor Statistics.

Regarding career opportunities in one of the engineering fields, consider the smallest in terms of jobs: Marine Engineers and Naval Architects. Only 8,000 of these jobs are in the U.S., but 29% are 55 years or older. This means that in a decade we will have a need in this field as the current Marine Engineer workforce retires. Is there a shortage now? **No**. Will there be in 2025? Probably.

The youngest occupations on the other side are computer hardware engineers and agricultural engineers; just 12% of the current workforce in each is 55 or over. This means that the current and near graduation work force will be in place for decades and job opportunities may be is short supply very soon. Is there a shortage of computer hardware engineers? **No**.

The Mining and Geological Engineering field has only 8,300 positions in the U.S.…all filled. Is there a shortage? **No**.

This begs an interesting question; "*Should our students choose the job of their dreams based on future potential job placement or purely on what they want to do with their life…..even if that means possible unemployment?*"

We should keep in mind that statistically our students will have a 50 year work span and have an average of 3 distinctly different careers in their lifetime.

This may be a consideration when choosing an Engineering focus. Some fields are fairly close in application and may provide unique opportunities down the road. One thing is certain; any direction they choose will require the same STEM skills…..good news.

Professionals and new graduates in various engineering fields from around the globe are entering the American workforce and filling available jobs because they are qualified and industry needs them now. Business is business and sometimes patriotism takes second place.

The best response you can give when your students ask about engineering careers is, "What kind of engineering?" The variety of fields is enormous and very diverse. When talking about engineering at all, please be specific and use the appropriate field name. It's possible that your students have no idea of the vast array of engineering career job responsibilities.

A career as an Acoustic Engineer is very different than that of an Agricultural Engineer. No matter the interests of your young men and women, these engineering fields offer something for everyone…..***as long as we are specific for them.***

Here is a short list of just a few engineering fields -

- Acoustic Engineering
- Aerospace Engineering
- Agricultural Engineering
- Applied Engineering
- Architectural Engineering
- Audio Engineering
- Automotive Engineering
- Biomedical Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Environmental Engineering
- Industrial Engineering
- Marine Engineering
- Materials Science Engineering

"Our students will have about a 50 year work span with an average of 3 separate and probably distinct careers"

- Mechanical Engineering
- Mechatronic Engineering
- Mining / Geological Engineering
- Molecular Engineering
- Nanoengineering
- Nuclear Engineering
- Petroleum Engineering
- Robotics Engineering
- Software Engineering
- Structural Engineering
- Telecommunications Engineering
- Thermal Engineering
- Transport Engineering

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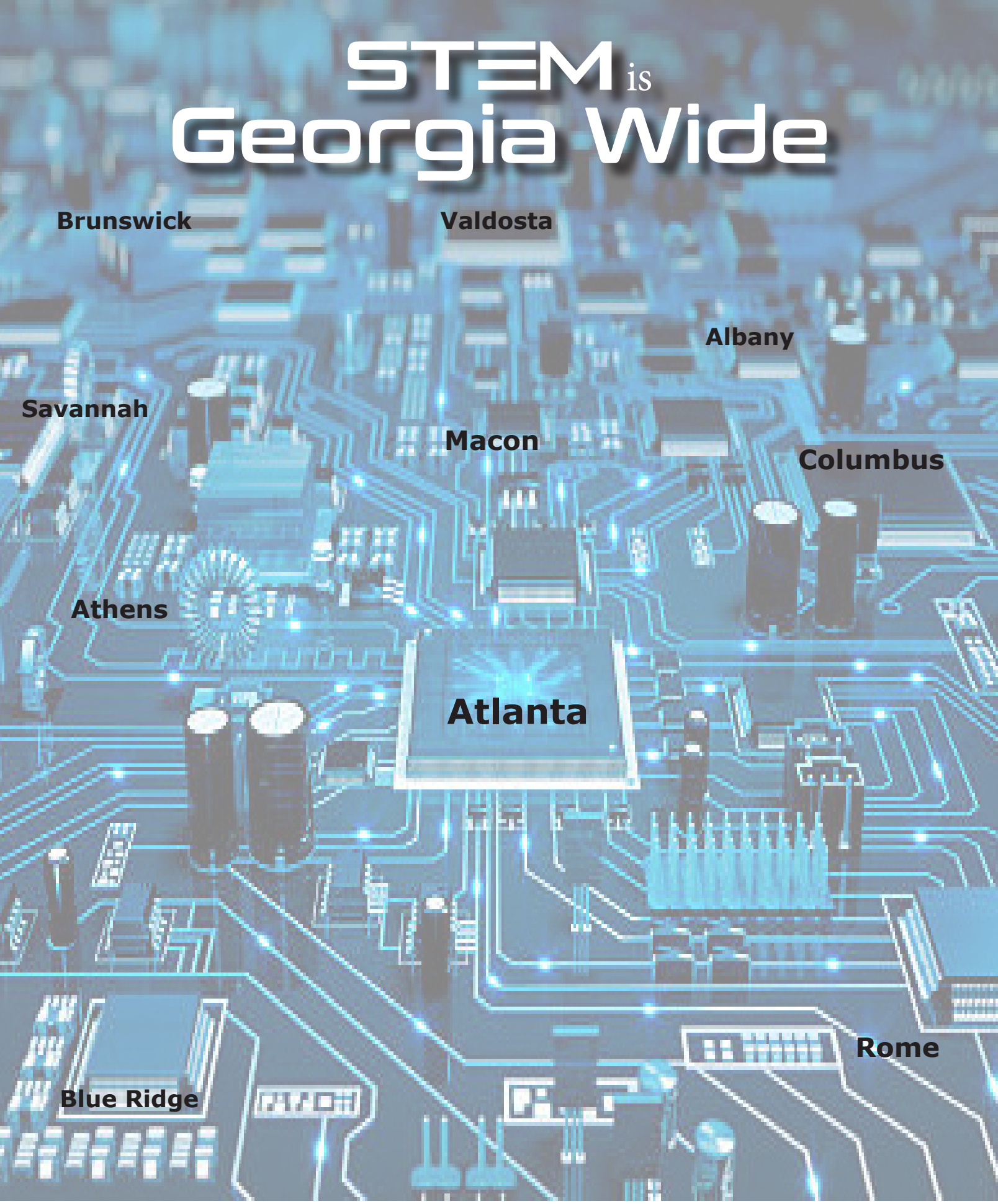

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