
2018 - 2019 ANNUAL REPORT

NATIONAL CYBERWATCH CENTER

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ANNUAL REPORT 2018-2019

Cybersecurity Education Solutions for the Nation



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Electronic copies are available here: library.nationalcyberwatch.org

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EXECUTIVE DIRECTOR'S MESSAGE



Dear Colleagues,

I look forward to writing this Annual Report each spring, as it allows me and the National CyberWatch (NCC) team to take stock of the many accomplishments from the past year, as well as recognize the people that helped along the way.

There are some themes that present themselves as you read through this report: the un-paralleled experience of the NCC team; the longevity of many of the NCC programs; the voluminous high-quality output year-over-year, on essentially shoe-string budgets; and the continued growth in numbers of students and faculty, as well as academic member institutions served.

You'll also hear the powerful stories from those that have benefited from our collective work, and see the ways we are moving the needle towards solving some of our country's biggest workforce and national security challenges. Answers to questions "What were the results of our work last year?" "What differences did it make?" will be answered.

My hope is to connect the everyday activities of the NCC to our mission so you can glimpse through the same lenses we use to decide how we spend our time and what projects to focus on; those that ultimately advance cybersecurity education and strengthening the national cybersecurity workforce.

These successes are not possible without the support of the dedicated NCC team, our academic network of higher education institutions, faculty, students, industry, and government partners, and the senior leadership team at Prince George's Community College, especially Dr. Charlene Dukes and Dr. Clay Railey. We are also grateful for the ongoing support of our National Science Foundation Program Officers, Dr. Corby Hovis and Dr. Victor Piotrowski, as well as our National Visiting Committee members.

As NCC builds on its 14-year foundation of success, there's tremendous opportunity for a partnered approach that:

- Focuses on creating value through products and services that get applied broadly across various industries
- Continues the sustainability work to position NCC for the long-term
- Expands opportunities for the Center to scale ideas and attract new sources of funding
- Integrates business into the NCC "equation," and
- Enhances the unique learning needs to combat ever-changing and damaging attacks on our personal data and critical infrastructure

Sincerely,



Casey W. O'Brien

Executive Director & Principal Investigator, National CyberWatch Center

ACCOMPLISHMENTS

■ APPRENTICESHIPS: SKILL UP TO SCALE UP

NCC began a research project to investigate interest across the country in a new concept for scaling apprenticeship programs called **Skill Up to Scale Up**. Under this program, incumbent IT workers will take part in virtual upskilling programs - assessment, personal development planning, training, job rotation, and on-the-job learning - that provide continual evaluation of the readiness to perform more demanding job responsibilities.

■ COMMUNITY COLLEGE CYBER SUMMIT (3CS)

3CS continues to meet the need for a national academic conference that focuses on cybersecurity education and workforce development at the community college level.

The 2018 3CS was held at Mt. Hood Community College, Gresham, Oregon, August 2-4, 2018. This was the first Summit on the West Coast. NCC and its co-producers: Center for Systems Security and Information Assurance (CSSIA), CyberWatch West, and BATEC (Broadening Advanced Technological Education Connections), attracted new sponsors, new employers for the Student Job Fair, and new attendees. Highlights included:



- Theme: Expanding Expertise - Transforming Cybersecurity Programs
- Pre-Summit Job Fair: Aug. 2
- NCC Executive Director/PI briefing with sponsors and NCC partners
- Launch of the NCC Cybersecurity Skills Journal: Practice and Research (csj.nationalcyberwatch.org)
- Record number of sponsors
- Four tracks: New to Cybersecurity; Experienced in Cybersecurity; Expanding Expertise; and Student Track

“Educational, inspirational and outstanding great experience for those students that are near or in the midst of finishing their Cyber security degrees”

- Cyndie Ramirez, Student
Southern New Hampshire University

“Amazing conference with the most passionate colleagues dedicated to keeping our nation secure.”

- Karen Wosczyzna Birch, Executive Director
Regional Center for Next Generation Manufacturing

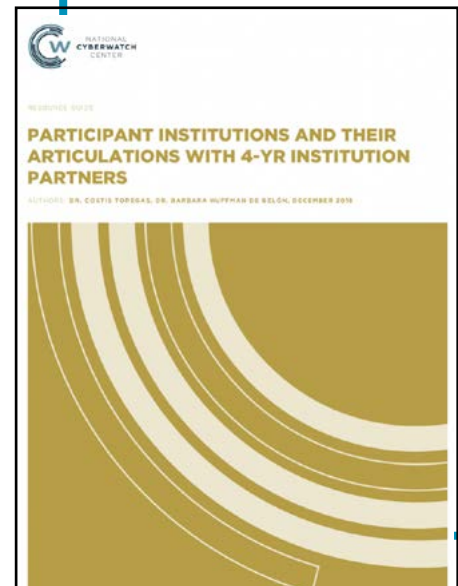


CYBERCORPS® SCHOLARSHIP FOR SERVICE (SFS) PATHWAYS PROJECT

Scholarship for Service (SFS) is a long-established National Science Foundation program (with support from the Dept. of Homeland Security and the Office of Personnel Management) that provides full scholarships to students enrolled in selected four-year universities (and now, partner community colleges), and a requirement that the student work for at least an equal number of years in federal, state, local, or tribal government agencies as the scholarship funding.

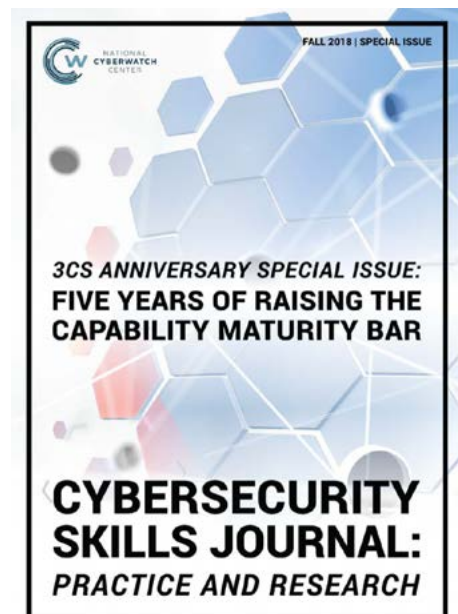
One of the objectives of the NCC Pathways Project was to track the performance of the participating two- and four-year schools and provide NSF with observations and suggestions for strengthening the program. Existing degree articulations or transfer agreements between the associate and bachelor degree programs were part of this data collection effort.

The CyberCorps® Scholarship for Service (SFS): Participant Institutions and Their Articulations with 4-YR Institution Partners Resource Guide (www.nationalcyberwatch.org/resource/sfs2019), published via the NCC Digital Press, contains a collection of course requirements associated with articulations and transfer agreements that have been shared with the NCC researchers from all but one of the twenty-four (24) participating institutions, with the expectation that they might provide schools interested in duplicating the Pathways experiences with a roadmap to examples of linkages between community colleges and universities.



CYBERSECURITY SKILLS JOURNAL: PRACTICE AND RESEARCH

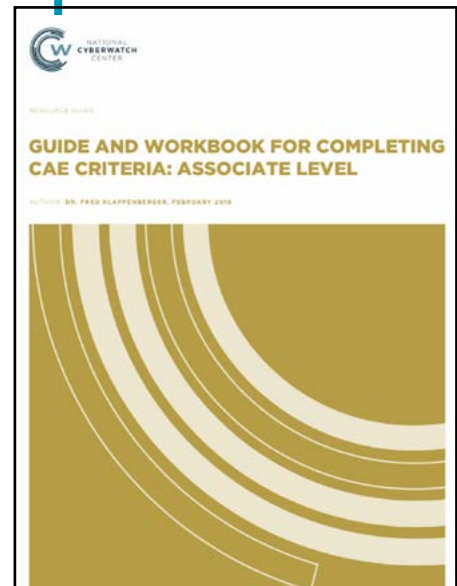
In August 2018, NCC launched the world's first double-blind, peer reviewed journal dedicated to the scholarly analysis of cybersecurity education and professional practice, the Cybersecurity Skills Journal: Practice and Research (CSJ). The journal's first issue was a Special Issue to commemorate the fifth-year anniversary of the 3CS, "3CS Anniversary Special Issue: Five Years of Raising the Capability Maturity Bar." The goal of the CSJ is to stimulate professional discussion and advance the interdisciplinary field of cybersecurity through the publication of scholarly works of value and interest to the profession. The CSJ seeks to integrate and expand the methods, processes, and evidence of effective practices which underlie skilled performance. The CSJ focuses on valued, measured results; considers the larger system context of people's performance; and provides valid and reliable measures of effectiveness.



DIGITAL PRESS

The following publications were published through the NCC Digital Press, which produces and disseminates collections of timely publications related to cybersecurity education:

- *Cybersecurity Skills Journal: Practice & Research, Vol. I, Issue 1: 3CS Anniversary Special Issue: Five Years of Raising the Capability Maturity Bar*
- *Guide and Workbook for Completing CAE Criteria - Associate Level* (funded by National Security Agency Grant # H98230-17-1-0231)
- *Participant Institutions and Their Articulations with 4-YR Institution Partners Resource Guide*
- *2018 Innovations in Cybersecurity Education* booklet



INNOVATIONS IN CYBERSECURITY EDUCATION AWARDS & RECOGNITION PROGRAM

The 2018 Innovations program continues to build on the previous year's lessons learned and successes. The deadline for application submissions was May 21, 2018. Shortly after, a panel of cybersecurity educators and NCC partners reviewed the submissions, 67 in total (up from 44 last year), and selected five for recognition at the 2018 3CS in Portland. 2018 Innovation Winners by Category:

Curriculum: "Community Initiative Center of Excellence for Secure Software (CICESS) - Employer-led Secure Software Development Dual Model Apprenticeship Partnering with Community Colleges." Submitted by Illinois Central College: Girish Seshagi (ISHPI Info. Technologies), Nancy Mead (Carnegie Mellon University), and Julie Howar (Illinois Central College)

Faculty Development: "Industrial Control Systems Security Curriculum Resource Kit." Submitted by Jacksonville State Uni.: Dr. Guillermo Francia

Lab Activity: "Have My Smart Lightbulbs Been Weaponized: Introducing Computer Security Issues Related to IoT Devices." Submitted by California State University, Chico: David Zeichick

Local Partnerships: "Guiding Girl Scouts through a Computer Science Journey." Submitted by Gulf Coast State College: Guy Garrett

Student Learning Aid: "Comic-BEE: Branching, Interactive Web Comics for Cybersecurity Education and Assessment for Learners of All Ages and Levels." Submitted by Secure Decisions: Laurin Buchanan



View the full 2018 Innovations in Cybersecurity Education booklet:
www.nationalcyberwatch.org/innovations

MARKETING AND COMMUNICATIONS

NCC's marketing and communication efforts continue to be one of its signature services. Highlights include:

- High quality publication and graphic design
- Integrated marketing and communications tied to specific NCC program goals
- Full complement of services: social media, branding, publication and graphic design, media releases, copy writing, monthly e-Newsletter design and dissemination, e-blasts
- Expertise in the latest marketing and communication trends
- Easy distribution of content across the NCC's various social media platforms
- Tracking, reporting, and usage of these systems



The hustle and bustle of holiday shopping, peppermint mochas and cookie baking are infiltrating our lives. To help take one thing off your plate, the National CyberWatch Center has put together five Holiday Hacks for your cybersecurity classroom! Peruse these innovative blogs and get your classrooms in tip-top shape for 2019!

HOLIDAY HACK #1

Follow the Digital Brick Road... New Curriculum Creates Paths into High-Tech Fields
Creating an exciting new pathway toward lucrative jobs in high-tech sectors isn't an easy job to tackle, but this Holiday Hack nailed it with its employer-led secure software development dual-model apprenticeship that partners with multiple community colleges and industry leaders!

[READ HOLIDAY HACK #1](#)

HOLIDAY HACK #2

Hitting a Homerun in Cybersecurity Education

To teach it is one thing. To teach it well so that students comprehend it is a whole different ballgame. This Holiday Hack took a creative step forward by producing a new Industrial Control Systems (ICS) Security toolkit that helps educators provide an enhanced cybersecurity experience for their students!

[READ HOLIDAY HACK #2](#)

HOLIDAY HACK #3

Staying Smarter than IoT Devices

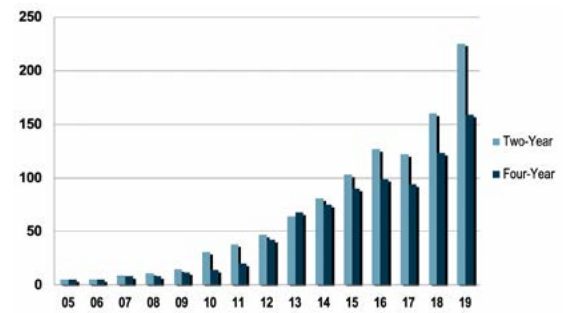
Face recognition gets you into your phone. Voice activation turns on your lights. Finger scans unlock your devices. We live in an era where we are inundated by methods keeping us connected via the Internet of Things (IoT). The future is smart, but are we? How are these smoke detectors, toaster ovens and wind turbines staying secure? This Holiday Hack is keeping students one step ahead of the crowd in IoT street smarts!

"The 'Holiday Hacks' e-mail blast is just wonderful! It is engaging, clever, well-timed -- and it's a brilliant way to highlight the Innovations in Cybersecurity Education winners."

Dr. Corby Hovis
Lead Program Director
Directorate for Education and Human Resources
National Science Foundation

MEMBERSHIP

NCC members continue to play a unique and powerful role in shaping cybersecurity education, workforce development, and emerging issues in research, assessment, and evaluation. NCC provides varied opportunities for members to engage directly with NCC's staff, programs and events, as well as with established and emerging leaders in Information Security.



MID-ATLANTIC COLLEGIATE CYBER DEFENSE COMPETITION (MACCDC)

The MACCDC, now in its 14th year, consists of both virtual qualifying rounds and a face-to-face final round engaging full-time undergraduate and graduate degree-seeking students, representing four-year universities and community colleges from Delaware, the District of Columbia, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, and West Virginia. In the past 14 years, over 2,300 students have participated in the MACCDC.

2018 MACCDC Scenario: "Breaking News"

A major online news service, the SWoRN Chronicle, has recently been the target of a group of Hackistanian hackers who appear to want to disrupt the reliable and credible reporting that sets the Chronicle apart from other news organizations. The ability of these insurgents to generate fake news in order to sway public opinion has been well documented. They use a variety of methods and are currently exploiting and infiltrating SWoRN Chronicle systems. Evidence has included the insertion of malware, bogus news stories, and complete hijacking of systems.

2018 MACCDC Dates:

- Virtual Regional Qualifiers: Feb. 1 & 7, 2018: 30 teams
- Face-to-Face Regional Finals: March 15-17, 2018: 8 teams
- National CCDC: April 13-15, 2018 (Orlando, FL): 10 teams

2018 MACCDC Final Regional Standings:

1. University of Virginia
2. Uni. of Maryland, Baltimore County
3. Wilmington University



The winner of the 2018 MACCDC, The University of Virginia, went on to win the National CCDC in Orlando, Florida. This is the second year in a row that a team from the Mid-Atlantic region has won the National CCDC (the University of Maryland, Baltimore County won the 2017 National CCDC).

NATIONAL CURRICULUM

NCC continues to develop and promote its reference curriculum degrees and certificate programs in Cyber Defense, Network Security Administration, Network Forensics, Secure Software Development, and Systems Security Administration, as well as work with academic institutions to implement new programs, or update existing ones.

To view the range of curricular offerings and benefits of adopting this content in both educational and training programs, see *National CyberWatch's Information Security Curricula Guide: A Complete Solution for Higher Education Institutions*:

nationalcyberwatch.org/resource/curriculum-guide

"The National CyberWatch curriculum guidelines were a key influence on our degree. Our desire was to create a general cybersecurity degree with a smaller core and room for specialization among the electives. The spreadsheet shows how we looked at 4 degrees from the National CyberWatch guidelines, found our equivalent courses, and selected core courses for our degree (yellow highlights) based on the intersection of courses in the National CyberWatch degrees. We also created pathways within the electives (not shown) guided by the National CyberWatch degrees.

Thanks for providing this helpful resource and all the other great work you do with the National CyberWatch Center."

- Cara Tang, Ph.D., Faculty & Department Chair, Computer Information Systems, Portland Community College

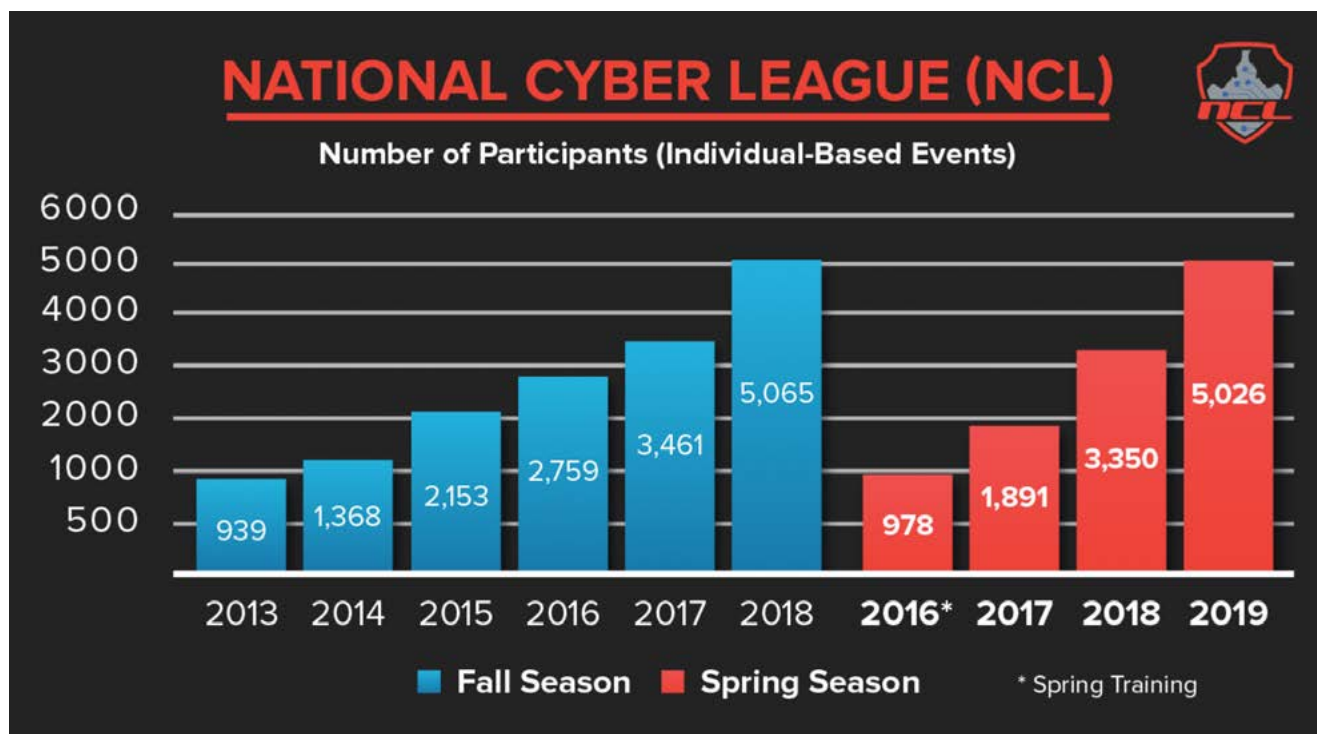
VIRTUAL BROWN BAG LUNCH SERIES

The Virtual Brown Bag Lunch Series is aligned with the mission of the Cybersecurity Skill Journal, and in support of the NCC Foundation Series Competency-based Mastery Learning Curriculum. Its goals are to highlight inventions and innovations in cybersecurity competency-based mastery learning. A total of 12 VBBL's have been produced as of this writing. Each VBBL is recorded and uploaded to the NCC YouTube channel and website for follow on promotion and retrieval.



NATIONAL CYBER LEAGUE (NCL)

Now in its eighth year, the NCL is a defensive and offensive puzzle-based Capture-the-Flag (CTF) cybersecurity competition. Its virtual training ground helps high school and college students prepare and test themselves for cybersecurity challenges that they will face in the workforce. All participants play the games simultaneously as both individuals and in teams.



“Again - thank you for all you do - Your work and NCL is a blessing to our profession and helps to create the next generation of cyber warriors.”

Jim Furstenberg
Assistant Professor,
Information Security and Intelligence
Ferris State University



NATIONAL CYBERSECURITY STUDENT ASSOCIATION

With a focus on growing Student Chapters and forging industry and professional association partnerships, the National Cybersecurity Student Association continues to fulfill on its vision of cultivating a national community that supports students in their cybersecurity endeavors through extracurricular activities, career opportunities, mentoring, and keeping them at the forefront of cybersecurity trends.



PARTNERSHIPS

NCC's collaborative model is based on broad interaction with stakeholders from educational institutions, businesses, government entities, and professional organizations. New Partners include:

- Cyber & STEAM Global Innovation Alliance
- Institute of World Politics, Cyber Intelligence Initiative
- Splunk
- IBM
- Kaplan IT Training
- Practice Labs
- ISHPI Information Technologies, Inc.

“National CyberWatch shares our commitment to broadening participation of women in Cybersecurity and to that end has been an important partner to the Institute for Women in Trades, Technology & Science.”

- Donna Milgrim
Executive Director, IWITTS

DIVERSITY

NCC has ongoing partnerships with the following organizations committed to diversity in both academic and workforce settings:







- Cyber & STEAM Global Innovation Alliance
- International Consortium of Minority Cybersecurity Professionals (ICMCP)
- Institute for Women in Trades, Technology and Science (IWITTS)
- Women in Cybersecurity (WiCyS)
- Information System Security Association Security Interest Group
- Women in Security



■ WEBCAST SERIES

The Webcast Series, now in its fifth year, promotes the transfer of innovative, cost-effective and sustainable cybersecurity education and workforce development solutions. NCC ran six webcasts in 2018, focusing on a range of topics.

All webcasts were recorded and made available on the NCC website for further promotion and retrieval.

		
November 29, 2018 Challenges for Medical Cybersecurity: Understanding the Current Crisis, Emergent Technologies, and Developing Risk Management Strategies that Reward Getting it Right	September 27, 2018 Machine Learning, Computing as Signal and Security	June 28, 2018 The Importance of Cyber Intelligence in Law and Criminal Justice
		
April 26, 2018 The Relationship Driven Cyber Leader	February 22, 2018 Culture Change that Sticks	January 24, 2018 2030: Building a Diverse Cybersecurity Workforce



NATIONAL CYBERWATCH CENTER TEAM

You'd be hard pressed to find a more experienced team working on information security education and workforce development in the world. A special thanks go to Barbara Belón, Bob Spear, and John Sener, who have been with the Center 14, 12, and 14 years respectively. Your contributions and lasting legacy will live on.

Dr. Barbara Belón

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NATIONAL VISITING COMMITTEE (NVC)

Successful National Science Foundation applicants for large grants are required to appoint an NVC. These committees are groups of advisors that work with grantees and NSF to help them achieve their goals and objectives. They assess the plans and progress of the project and report to NSF and the project leadership. Committee members also provide advice to the project staff and may serve as advocates for effective projects.

In general, NVCs are similar to the advisory committees that are already an integral part of higher education institutions. In fact, most state and federally funded programs for these colleges require a local or regional advisory committee. However, there are differences between these committees and the NVCs. For example, local advisory committees report only to the project leadership who, in turn, set the meeting agendas. The NVCs not only report to the project, but also to NSF. Furthermore, NSF appoints the committee members, and the NVC chairperson plays a major role in setting the agenda.

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Florida

Dr. Philip Crager

Associate Professor of Cybersecurity
Department of Security Studies and
International Affairs
Embry-Riddle Aeronautical University
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Dr. Gaby Hawat

NVC Chair
Principal
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Lead Program Director
Directorate for Education and Human
Resources
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Dr. Victor Piotrowski

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Elayne Starkey

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State of Delaware
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Georgia Weidman

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