

In Pursuit of Excellence: An Emerging National Center of Academic Excellence in Information Assurance Education – The Case of New Jersey City University

John W. Collins, Jr., CPP, Ed.D., *New Jersey City University*; Tsung (Bill) Soo Hoo, Ph.D., *New Jersey City University*;
and Michael Krantz, Ph.D., *New Jersey City University*

Abstract – This article provides an overview of an actual application for the *National Center of Academic Excellence in Information Assurance Education (CAEIAE)* program designation, by one university. Each institution is unique and the experiences provided here are illustrative only. The key to success is providing evidence for each major area of submission. The use of electronic resources, Uniform Resource Locators (URLs) /addresses are emphasized. Applicants can best serve their efforts by assisting NSA evaluators and reviewers with artifacts and verification. The authors have noticed at previous CISSE annual meetings this subject is not well addressed. The need extends beyond CISSE participants seeking the CAEIAE designation, as there is also a research designation. This article can serve as a catalyst for additional institutions sharing their best practices and actual work in acquiring/reacquiring the designation(s), as the criteria changed this past year.

Index terms:

National Center of Academic Excellence
Committee on National Security Systems
Information Assurance Courseware Evaluation

I. INTRODUCTION

This paper will be presented at the 13th *Colloquium for Information Systems Security Education (CISSE)*. Like many other readers, the authors have attended previous colloquia. The leadership of the CISSE works very hard behind the scenes on making each event informative and pragmatic for the attendees. In support of this focus and mission, the authors opted to pull together all the current

All three authors are full-time faculty members with the College of Professional Studies, Professional Security Studies Department at New Jersey City University in Jersey City, New Jersey. Dr. John W. Collins, Jr., CPP is an Associate Professor and Graduate Coordinator; Dr. Tsung (Bill) Soo Hoo is the Department Chairperson and Dr. Michael Krantz is an Assistant Professor and Undergraduate Coordinator. Their contact information: Telephone – (201) 200-2275 and Emails – jcollins2@njcu.edu; bsoohoo@njcu.edu; and mkrantz@njcu.edu

information on acquiring the *National Center of Academic Excellence in Information Assurance Education (CAEIAE)* program designation, by using our own experiences with the process – the case of New Jersey City University. Some readers are already designated as a *Center of Academic Excellence* and may immediately assume there is nothing new in this paper and move on. That would be a big mistake as systems management theory reminds us to continually revisit our processes and pay close attention to the feedback loop. This paper will serve as practitioner-based feedback loop. Each of us attends the CISSE for different reasons. Most are looking for best practices and ways to improve our information assurance education efforts. The CISSE highlights include nationally recognized experts, presentations by peers, and formal ceremonies for newly re- or certified institutions along with a smaller group of CAEIAE designations by key NSA officials. One aspect that can continue to be improved at the CISSE, is discussion of the certification and CAEIAE designation process from the perspective of the faculty and staff of the institution seeking those recognitions. The CISSE always provides venues and speakers on the topic, but coming from those living and breathing the process – we can improve. That is the impetus for this paper. Working with the standards and the CAEIAE application, we can become overwhelmed by the sheer volume of information and requirements for recognition. The decision to become NSA certified and/or CAEIAE designated institution should not be taken lightly. The associated work inside and outside the classroom can seem onerous. Without the backing of your institution's leadership and a good division of labor, the process can easily become mission impossible. Some institutions seek the designations for the promise of federally funded grants, internships and scholarships. Their motivation might be looking for the millions of dollars they perceive are there for the taking. Most of us remember the immensely popular prime time game show *Who Wants to be a Millionaire?* which ran from 1999-2002 on the ABC network. The premise of the game was to be knowledgeable enough to get to the million dollar question and THEN properly answer that final inquiry to

win the ultimate prize. The questions were designed to increase in difficulty as a player moved from one level to the next in a fifteen-step process. While this example may seem absurd there are aspects of the game show that ring true when pursuing CAEIAE. So, you want to be a *National Center of Academic Excellence in Information Assurance Education*? The idea that the CAEIAE designation will result in millions is quickly nipped in the bud, by the application form itself: "Designation as a *National Center of Academic Excellence in IA Education* does not carry a commitment of funding from the National Security Agency or from the Department of Homeland Security."

Then why would anyone even bother to apply to the NSA for the CAEIAE or even write a paper on this topic? The answer is clear – so that students, faculty and staff in academia can stay abreast of IA developments and innovations. Technology changes at a blurring pace and the associated information security is vulnerable without IA professionals. "America is already reaping benefits from the current [National] Centers [of Academic Excellence]. Graduates steeped in information assurance education are now entering the federal and greater American workforce. Those graduates, and graduates to come, are forming the cornerstone for America, taking cyber security to the very edges of the National Information Infrastructure and the Global Information Grid."

(Daniel G. Wolf, Director, Information Assurance Directorate, National Security Agency, April 22, 2004)

Five years later and Director Wolf's comments are still valid and reliable. The joint *Centers of Excellence* efforts between the *Department of Homeland Security* and the *National Security Agency (NSA)* are directly improving information assurance/cyber security domestically and internationally. The *Centers* serve as bastions for information assurance education. More poignantly, the *International Telecommunication Union* (the leading *United Nations* agency for information and communication technologies) routinely looks for solutions from the United States security community.

II. RELEVANT REFERENCES

With this backdrop, no one in today's ever-changing technological world could refute the importance of information assurance education. Colleges and universities are continually seeking to meet the demand of the field. To follow this through to its logical conclusion, standards and certifications are critical for the information assurance professionals working in the government and the private sector. Astutely the NSA developed and

implemented an elaborate *Information Assurance Courseware Evaluation (IACE) Program* to certify institutions of higher education.

"IACE systematically assesses the degree to which courseware from commercial, government, and academic sources maps to the national standards set by the Committee on National Security Systems (CNSS).

Certified institutions meet the minimum standards for the duties and responsibilities of:

Information Systems Security (INFOSEC) Professionals, NSTISSI 4011
 Senior Systems Managers, CNSSI 4012
 System Administrators (SA), CNSSI 4013
 Information Systems Security Officers, CNSSI 4014
 System Certifiers, NSTISSI 4015
 Risk Analyst, CNSSI 4016" [1]



The criteria for measurement are specific and detailed. Applicants need to fully understand the standards before they can move forward in pursuit of the Center of Academic Excellence. There are prerequisites that must be met:

“Prerequisite: Prior to submitting an application for the National Centers of Academic Excellence in IA Education Program, IA courseware must be certified under the IA Courseware Evaluation Program as meeting the Committee on National Security Systems (CNSS) Training Standards and the certification must be current. Specifically, certification for CNSS Training Standard 4011 is required, and certification of at least one additional CNSS Training Standard (4012, 4013, 4014, 4015, 4016 or subsequent standards) is required.

<u>Criteria Name</u>	<u>Value</u>
1 <i>Outreach/Collaboration</i>	15 min/25max
2 <i>IA Treated as a Multidisciplinary Science</i>	10 min/20 max
3 <i>University Encourages the Practice of IA</i>	17 min/25 max

4 Academic Program Encourages Student Research in IA	20 min/40 max
5 Faculty Active in IA Practice and Research	20 min/55 max
6 IA Resources	8 min/15 max
7 IA Program is Active and Robust	15 min/45 max
8 Declared Center for IA Education	20 min/35 max
9 Number of IA Faculty and Course Load	20 min/40 max
Total	145 min/300 max

MINIMUM POINTS REQUIRED TO QUALIFY AS A CAEIAE = 145

MINIMUM POINTS MUST BE MET FOR EACH OF THE TEN CRITERIA.” [2]



III. METHODS AND DATA ENTRY

The submissions for each section are provided below for New Jersey City University. Input will be unique to each institution. Our remarks are provided as examples for others to use as guides for their own submissions. The preparer(s) for your institution should be able informally score the submission, keeping in mind minimums are needed in each area and some do not apply to every institution, e.g. doctorate degrees in Information Assurance. Each area is listed below with the latest criteria and narrative from the National Security Agency’s application website. This example is for *National Center of Academic Excellence in Information Assurance Education (CAEIAE)* and not the research designation.

The application wording is provided below and direct attribution belongs to the *Criteria for Measurement* website [2]. All applicants will be required to register by: “... contact the National Centers of Academic Excellence in Information Assurance Education Program Office by email, AskCAEIAE@nsa.gov, to establish access to the on-line application. Use of the on-line application process is required. The electronic process enables the submitting institution to have multiple individuals participate in the entry of data, while giving the lead individual the ability to review all data and electronically submit the application. The process is intended to simplify the submission of data; create thorough and uniform submissions; and enhance the review process.”[3]

Applicants are also required to submit a letter of intent [to apply for the designation] to the same office, 30 days

prior to the submission deadline. This letter must be signed by a dean or higher official of the institution. Further this letter certifies regional accreditation and the institution is at least a 4-year degree granting university or college.

The actual application will require an iterative process and takes multiple years to successfully achieve the CAEIAE designation. In the case of *New Jersey City University*, the process was intensive and required exceptional attention-to-detail. Even then, an item (which carries points) can still be missed or overlooked. There are areas or criteria that are very difficult and others that are in place by the very fact you have successfully completed at least two CNSS standards (4011 and one other). Of special note, we had to work extremely hard on these areas: **University Encourages the Practice of IA, Faculty Active in IA Practice and Research, Declared Center for IA Education, and Number of IA Faculty and Course Load**. To assist others in their CAEIAE efforts, we will provide our strategies, electronic resources, Uniform Resource Locators (URLs) /addresses and hyperlinks (where possible) to model what evidence and artifacts the CAEIAE reviewers are seeking. (See the Notes and Resources at the end of this article). With regard to the above four areas, here is what we accomplished over a couple of years:

University Encourages the Practice of IA. New Jersey City University had a long history of established and documented policies, procedures, and self-help items on the main website/Homepage. The area that was lacking was the creation of a NSA recognizable IA Security Plan (using one of the recommended templates) and then ensuring at least one Information System Security Officer (ISSO) was assigned and in place. Higher education inherently does not resemble this organization and structure. Over the years, we worked with the University’s Information Technology (IT) Department and established a viable plan and documented those individuals responsible for the ISSO duties – actually spread across two domains: networking and applications. These long-term actions required finesse and superior interpersonal deftness as perceived turf issues can emerge, e.g. IA academics vs. University IT practitioners. Since this NSA certification process began, now IT employees/practitioners have become students in our IA programs. This has gone a long way to resolve deficiencies and create a united effort across the University. For examples see the electronic references with this footnote. [4]

Faculty Active in IA Practice and Research. As a fairly new program at New Jersey City University, IA research was on the back-burner with the focus on faculty being teaching and University service. Over time and due

to one faculty member having prior publication experience this section has gradually improved and allowed sufficient points to go beyond the Criteria's minimums. Additional peer-reviewed articles (including this one), student-faculty joint publications and other research (grants) initiatives will make this area even better over time. For examples see the electronic references with this footnote. [5]

Declared Center for IA Education. This aspect takes the most time to get University-wide recognition. Depending on the governance at your University, this may take years as in the case of our University. A center can be declared at the Department level and endorsed by the College level at a minimum to apply for the CAEIAE designation. We applied with this level of declaration and continued concurrently with University-wide recognition. Happily we can report that the University Senate, University Administration and University President endorsed the IA Center to the Board of Trustees in February 2009 and approved the designation and naming of the Center. The **Dr. Dorothy E. Denning Center of Academic Excellence for Information Assurance Education** is now the focal point for all of our IA activities: research, teaching and service. This is exactly what was envisioned in establishing the NSA criteria on this area. For examples see the electronic references with this footnote. [6]

Number of IA Faculty and Course Load. In our first year of 4011 Certification, a single full-time faculty member and two adjuncts taught all the courses in the Department. Now there are three full-time IA professionals, including one administrator and two full-time faculty members: one in the Department and one shared from the Geography/Geoscience Department teaching IA topics in GIS and GPS technologies. Further, the IA adjunct faculty has grown to five, all possessing appropriate graduate degrees, professional certifications, e.g. CISSP, CPP, and/or certificates in IS/IT/IA.

The above are our areas that required the most work and interdepartmental and inter-college collaboration. It is much easier to go it alone in these areas, but the criteria and the reviewers will not let you get away with a silo mentality on IA and become a National Center of Academic Excellence. For examples see the electronic references with this footnote. [7]

IV. DATA ANALYSIS (SELF-ASSESSMENT)

Once you have completed your application it is a good practice is to analyze or self-assess your work. There is no guarantee that you will perfectly match the actual program reviewers' calculations or scoring. However, by using the *Criteria for Measurement* you will be able to

place your institution in the ballpark. More importantly, you should be able to identify areas that need additional improvement (especially important if the bare minimum points are not achieved). Based on the criteria and our self-assessment we determined the following scorecard for New Jersey City University:

<u>Criteria Name</u>	<u>Value/Self-Assessment</u>
1 Outreach/Collaboration	15 min/20
2 IA Treated as a Multidisciplinary Science	10 min/20
3 University Encourages the Practice of IA	17 min/20
4 Academic Program Encourages Student Research in IA	20 min/30
5 Faculty Active in IA Practice and Research	20 min/25
6 IA Resources	8 min/12
7 IA Program is Active and Robust	15 min/30
8 Declared Center for IA Education	20 min/25
9 Number of IA Faculty and Course Load	20 min/20
Total	145 min/202 (estimated)

Based on our self-assessment, *New Jersey City University* was able to document and provide evidence for an estimated 202 points. By meeting the minimums in each area and a score above 145, the *Criteria for Measurement* was successful met for the *National Center of Academic Excellence in Information Assurance Education* program designation. Some readers are able to discern the stronger areas from the weaker ones within our University. As you recall our challenges, the points for the previously discussed areas are higher than one might suspect, as once the work is done, you garner more points. This is why this self-assessment was added in this section, after sharing our experiences or previous weaknesses.

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In sum, this article captures the essence of acquiring the *National Center of Academic Excellence in Information Assurance Education* program designation. The entire process can take several years or more as the starting point is acquiring NSA certification with at least two CNSS standards (4011 and one other). As you review the criteria, notice the commitment that is required of students, faculty, staff and administrators. This can only work as a team effort. A major point of emphasis is that each criterion requires artifacts and/or evidence of the submissions. Our University opted to use the web resources and associated servers to document our input.

We concluded our success is based on support from across our campus. This cannot be a Departmental level effort in isolation. Our approach was to start at the college level and will eventually evolve to university-wide. This is evident in areas where university level points are available. Additionally, full-time faculty dedicated to Information Assurance is tenuous especially in education environments with limited or reduced budgets. In such cases extraordinary efforts with articulation agreements and shared faculty with other institutions are good solutions. This is especially true with colleges and universities that are supporting underrepresented and minority student populations. The application rewards these relationships. This conclusion in particular is useful for all types of potential agreements. One that comes to mind is the community college that has been seeking the *National Center of Academic Excellence in Information Assurance Education* program designation. By the current rules this is not possible due to the 4 year college or university stipulation. However, community colleges can tag-team and fall under the designation with a senior college or university. Our University will continue to seek feeder students from community colleges with entry to bachelor degree programs at the junior level.

Several recommendations surfaced from our University's application. We recommended to our leadership that the Center of Academic Excellence designation be moved from college level to university level. This required coordination and approval through the University Senate, University Administration, University President and then Board of Trustees. The initial designation was made within the department and college to allow the minimum for a CAEIAE application. This change made Information Assurance more visible beyond the college level and encouraged a wider range of disciplines to become more involved with our efforts. This should also increase faculty activities in IA practice and research. Second, the Information Assurance planning requires even more refinement than first anticipated. This is clearly a multi-year effort between all constituents and stakeholders. Third, two or more full-time Information Assurance faculty members are needed for current programs and activities. We have plans to pursue a professional doctorate in the next few years. That degree will require at least three other full-time professors. These recommendations would not only increase our future CAEIAE application/renewal points, but the true contributions will improve our offerings and academic quality.

Due to the paucity of actual applications for the *National Center of Academic Excellence in Information Assurance Education* program designation, we feel this article is long overdue. Further, we are looking forward to

presenting the content at the 13th *Colloquium for Information Systems Security Education* in Seattle, Washington. Once participants hear our about experiences and exchange their ideas, the result will be a better informed Information Assurance education community. . . all in the pursuit of excellence!

[1] Committee on National Security Systems. *IA Courseware Evaluation Program*. Downloaded/address confirmed on February 19, 2009:
http://www.nsa.gov/ia/academic_outreach/iaec_program/index.shtml

[2] Information Assurance Directorate. *Criteria for Measurement*. Downloaded/address confirmed on February 19, 2009:
http://www.nsa.gov/ia/academic_outreach/nat_cae/cae_iae_program_criteria.shtml

[3] Information Assurance Directorate. *Centers of Academic Excellence*. Downloaded/address confirmed on February 19, 2009:
http://www.nsa.gov/ia/academic_outreach/nat_cae/applying_to_national_centers_of_excellence.shtml

[4] Examples of University Encourages the Practice of IA:

ISSO Appointments

http://web.njcu.edu/sites/profstudies/securitystudies/Uploads/njcu_issso_appointments_dec_23_2008.pdf

Critical Threats Resources (on Left Side)

<http://www.njcu.edu/dept/it/>

Policies, Procedures and Guidelines

<http://www.njcu.edu/dept/it/documents.html>

Desktop Security

http://www.njcu.edu/dept/it/documents/Desktop_Security_Guidelines.pdf

IT Links

<http://www.njcu.edu/dept/it/links.html>

Support

<http://www.njcu.edu/dept/it/support.html>

Instructions

<http://www.njcu.edu/Guarini/Instructions/instructions.htm>

Academic Computing

<http://www.njcu.edu/ac/>

Wireless User Guide

http://www.njcu.edu/dept/it/documents/support/Wireless_User_Guide.pdf (Notice Security Banner for Local Wireless Access - not visible outside of AP range)

GothicNet

https://gothicnet.njcu.edu/psp/psft/EMPLOYEE/EMPL/h/?tab=PAPP_GUEST

GothicNet Password Guidelines

<https://www.njcu.edu/activedir/usageofgothicnetidsandpasswords.html>

GothicNet Self-Help (Identification & Authentication)

https://www.njcu.edu/activedir/gothicnet_troublesigningon.asp

[5] Examples of Faculty Active in IA Practice and Research:

Articles

Collins, J. (2007, June). Creating an Internet Portal for INFOSEC Professionals. Published proceedings of the 11th Colloquium for Information Systems Security Education - CISSE (held June 4 – 8, 2007). Boston, MA: Boston University.

Skeele, R. & Collins, J. (2007). Predators in the Electronic Playground: Prevention of Online Crimes against Youth. In C. Crawford et al. (Eds.), Proceedings of Society for Information Technology and Teacher Education International Conference 2007 (pp. 676-684). Chesapeake, VA: AACE.

Skeele, R. & Collins, J. (2008, June). From Pre-School to Post-Grad Education – Biometrics Gain Acceptance. Published proceedings of the World Conference on Educational Multimedia, Hypermedia & Telecommunications (held June 26 – July 4, 2008). Vienna, Austria.

Soo Hoo, T., Krantz, M. & Collins, J. (2008, Spring). How to Stay Safe in Cyberspace. Gothic Magazine. (11,1) 9-10.

Books and Book Chapters

Collins, J. (2009). Technology Leadership, Management and Policy: A primer and Integrative Model for the 21st Century. Ithaca, NY: Ithaca Press. ISBN: 978-0-9815116-2-7. Information Assurance/Cyber Security concepts are integrated throughout this text and Chapter 8 is totally dedicated to security.

Roland, J., Ed. (2009). In The Best of Learning & Leading with Technology Selections from Volumes 31–35 Eugene, OR: ISTE. ISBN: 978-1-56484-255-8.

Grants

Center for Instructional and Technological Innovation (CITI) Title V Grant – US Department of Education (\$807,698) - 2000-2008.

Evidence - CITI and computer lab links:

<http://www.njcu.edu/programs/citi/>

<http://www.njcu.edu/ac/home.htm>

<http://www.njcu.edu/ac/labs/proflabs.htm>

[6] Examples of Declared Center for IA Education:

The Professional Security Studies Department officially designated the **Dr. Dorothy E. Denning Information Assurance Education Center** with a clear link and sponsorship by the College of Professional Studies. The IA Center is named after a pioneer in the IA field, Dr. Dorothy E. Denning currently of the Naval Postgraduate School in Monterey, CA. On November 18, 2007, Professor Denning replied to our request to designate the Center in her name: "I am truly honored and happy to accept your request." The **Dr. Dorothy E. Denning Information Assurance Education Center** was recognized at the University level by the University's Board of Trustees on February 23, 2009.

Electronic evidence available:

<http://web.njcu.edu/sites/profstudies/securitystudies/Content/cae.asp>

[7] Examples of Number of IA Faculty and Course Load:

Administrators

Melanie McDonald, Ph.D. Assistant Dean, College of Professional Studies. Has administrative oversight of IA programs.

Tsung Y. (Bill) Soo Hoo, Ph.D. Chairperson, Professional Security Studies. Has academic oversight of IA programs.

Full-Time Faculty

John W. Collins, Jr., CPP, Ed.D. Lieutenant Colonel, US Army (Retired). Associate Professor of Cyber Security/Information Assurance. Devoted full-time to IA.

Shared Faculty (Inter Departmental; teaching IA in existing courses) -

Dr. William Montgomery, Associate Professor of Geoscience, NJCU Geoscience/Geography Department - teaches GIS and GPS technologies in existing courses with IA throughout.

Adjunct Faculty

Prof. Daniel H. Dawdy, CISSP

Prof. Donald Hand, CISSP

Prof. Kevin Kennedy, CISSP, CPP

Prof. Nicholas Tworischuk, CISSP

Graduate Assistant

Jonathan Heyman, ISSO (Entry)

Evidence - links for above input available at:

<http://web.njcu.edu/sites/profstudies/securitystudies/Content/iafaculty.asp>

<http://web.njcu.edu/sites/profstudies/securitystudies/Content/faculty.asp>

http://web.njcu.edu/sites/ProfStudies/Content/office_of_the_dean.asp

http://www.njcu.edu/graduate/academics/grad_college_prof_studies.asp

http://web.njcu.edu/sites/profstudies/Content/faculty_administrative_coordinators.asp