

Establishing a US National FOSS4G Academy

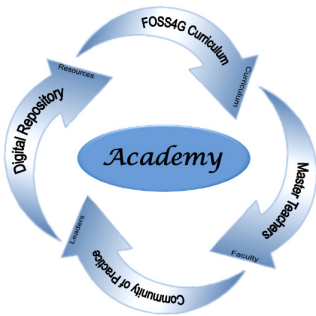
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Motivating Rationale

The **Free & Open Source Software for Geospatial (FOSS4G) Academy** project will create curriculum and educational materials and perform professional development under a grant from the US National Science Foundation. The Academy will consist of four components: a) certificate program based on seven FOSS4G courses and associated material, b) cadre of 50 geospatial faculty participants nationwide, educated in the latest FOSS4G software and Universal Learning by Design [4, 21] pedagogy practices, c) state-of-the-art open source eLearning platform capable of engaging 1000s of simultaneous learners and incorporating the latest in learner performance analytics and feedback, and d) community of practice, including extensive use of open source collaboration tools and social media to connect and sustain the Academy members over the long-term. The resulting FOSS4G curriculum will lead to a well-defined career pathway [24] in geospatial technology that can be offered at the undergraduate level as either a certificate or basis of an AAS or BS degree. It will incorporate the latest in pedagogy research and practice including the use of “flipped” lessons, massive open online courses (MOOCs) [1, 8, 25] and micro credentials [2, 3] to increase the quality and quantity of geospatial technology workers in the coming decade. *The*



*Vision of the Academy is to establish a vibrant community of educators, learners, and users of Free & Open Source Software for Geospatial applications. The **Mission** of the Academy is to create and sustain this vibrant community of educators dedicated to promoting the use of Free & Open Source Software for Geospatial (FOSS4G) applications to help meet America's need for a well educated Geospatial Technology workforce.*

Need for Academy

The Geospatial Technology Industry is a high-growth, high-technology field [6, 12] first recognized by the DOL in 2005 as being essential to America's economic recovery and national security. The industry was formally defined in June, 2010 with the publication of the Geospatial Technology Competency Model (GTCM) on the DOL Competency Model Clearinghouse. The industry is projected to require an additional 150,000 US technicians between 2010 and 2020 [6], at which time total employment will increase from the current 447,000 US workers to approximately 600,000 [6].

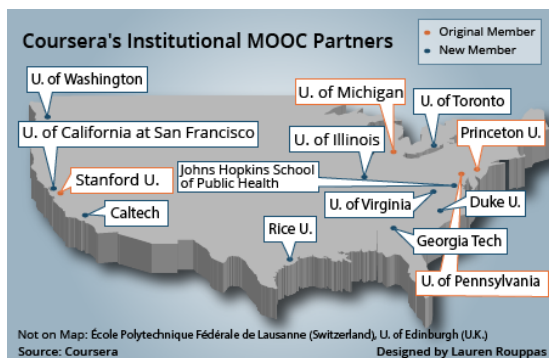
Occupation	Employment (2010)	Projected Growth (2010-2020)	Projected Growth Rate (2010-2020)
Geospatial Information Technician	210,000	51,600	3 to 9%
Remote Sensing Scientists and Technologists	30,000	13,300	3 to 9%
Remote Sensing Technicians	62,000	33,500	10 to 19%
Geodetic Surveyors*\	51,000	24,200	20 to 28%
Mapping Technicians	57,000	20,000	10 to 19%
Cartographers and Photogrammetrists	14,000	6,100	20 to 28%
Totals	424,000	148,700	(3 to 28%)

TABLE 1 - Project Geospatial Job Grow (DOLETA)

Source : U.S. Department of Labor Employment and Training Administration, O*NET Online, <http://online.onetcenter.org/>, August 1, 2012

Geospatial Occupations U.S. Department of Labor Employment and Training Administration

These workers will need the broadest range of knowledge, skills, and abilities (KSA) to sustain them throughout their professional lifetimes. The GTCM offers a comprehensive list of these KSAs, and describes the need for workers capable of using a variety of tools and technologies. The US higher education system currently offers geospatial technology in approximately 800 colleges and universities [18]. 750 of these colleges report offering geospatial software exclusively from a single proprietary, closed-sourced, vendor. The lack of variety in geospatial application software on these campuses limits the student's technology experience. What students require is a broad and inclusive range of technology exposure. This project will build a robust, GTCM-aligned, curriculum that will utilize a wide-range of FOSS4G software applications [14, 15] to broaden learner's KSA in a multiplicity of alternative tools.



Intellectual Merit

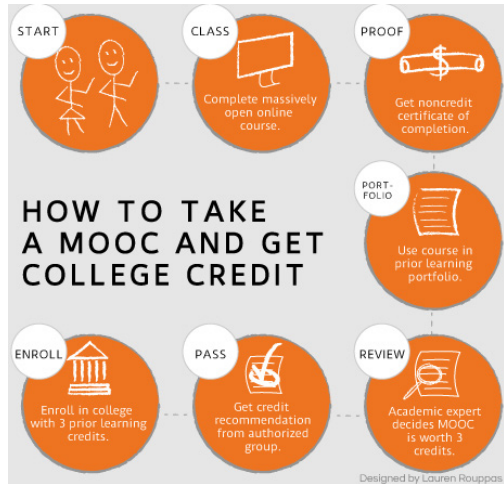
The Academy will 1) incorporate research-based instructional design strategies [7, 8, 11, 21] that build upon cognitive science and existing resources developed by leading-edge institutions, 2) it will incorporate potentially transformative strategies,

like the new flipped classroom [13, 20, 23] demonstrated successfully by Khan Academy and pioneered by the new generation of online course providers like Udacity and Coursera [1, 3, 8, 23]. The Academy will 1) introduce the students to a new, community based software development, user support and business model [2, 3, 7] that lowers the barriers for entrepreneur initiative. The FOSS4G Academy will 2) bring innovation into higher education by providing a deeper insight into the technology development and tools implementation enabled by the open source code and open participation in the development process [5, 9, 10, 17].

Broader Impact

The Academy incorporates 1) an innovative micro-credentialing plan [2, 3, 7] to allow learners to receive formal recognition of their new knowledge and skills. Through the use of authenticated badges, learners can accumulate digital evidence of their knowledge, skills, and abilities and may receive transferrable academic credit through a network of partner colleges. We will 2) develop a Spanish language version of the FOSS4G curriculum appropriate

for the young Spanish-speaking adult immigrants, primarily from Mexico, identified by the Obama administration's recently-passed US DREAM Act [16]. This act has the potential to add an additional 800,000 young working-aged adults (under 30), along with another 350,000 middle- and high-school dropouts to the US workforce.



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