4403 Symposium on Human Dynamics Research: A Dark Side to Data-Centric Geography? Where are the Reward Systems?
Panel
AAG Annual Meeting, San Francisco, April 1, 2016
http://dusk.geo.orst.edu/aag16-darkside.html

Main Sponsors: AAG GIScience & Systems, Cyberinfrastructure, and Remote Sensing Speciality Groups
Related Sponsor: AAG Public/Private Affinity Group

Intro by Dawn
Matt moderates discussion, goes through each of the questions in turn…

What changes in academic culture should we strive toward? What institutional barriers need to be removed?

Renee - she teaches a "software stack" NOT GIS; so what she teaches is not what she learned as a student

Is GIS considered legitimate within the institutions, a legit field of study in universities - in Canada it is considered much more a tool
Vulnerable to being moved out of geography
Others work with "big data" all the time, so why are you complaining about geography
Hard to convince colleagues that this is a thing - they see it as a service
Kuhnian shift - old guys have to die off
Institutional barriers are high - not as sexy

Karen - teaching people to think in a certain way, look at the data carefully, produce an understandable result - THAT'S the science -

Renee - her colleagues want her to teach a software stack, how to use the skills - they are deploying the students in their own sub-domain areas

Karen - Every time a student hits a button - think about what's coming in, what it means, how it's modeled, how it represents reality

What is the intellectual activity of coding?
Serge - committed to open source software - has written on this issues from which he has written on as a geographer
Most proud of the least cited paper - "show me the code" - get that for the web site
Thought he could swap out Esri tech for QGIS - got push back from students who wanted Esri software so they could get a job - the course was about the computational CONCEPTS; and faculty were in relationships with Govt agencies, private sector for this skill set; wanted students trained in Esri tech
As a full professor he has freedom and can use QGIS in his courses, and can choose his mode of doing SCIENCE

Werner - the research perspective
"Skills in research computing still not properly rewarded"

We get rewards - Not what you know but what you do with it?
We are expected to have these skills but we are doing science, creating trails of knowledge - the way we do science changes
We look for centroids, but biologists run similar experiments, do small things in the lab and are expected to do that as a pathway toward solving a scientific question. So should it be with data-centric geographers

Renee - Stack exchange is your friend - learn how to accommodate the rapid changes

Forrest:
Science, data mgmt, experience
He gets to talk to students for only 2.5 hours per week in a lecture
The "barrier" is that GIS is no longer, I took an intro and advance course and now I'm ready. I can DO GIS (at a professional level)
Students using GIS in their coursework in different ways; there can be THE GIS programming course, or some departments have 5 of these courses, some have 0. The students coming out of these different programs - vast disparity in skills
How to make the push/justification for teaching QGIS to teach the science more than the software

Matt - what about the cultures within the depts, how do you describe what you do? Do you feel the need to apologize for what you do and what you expect of your students
Spatial Sciences Institute - all speak the same language; but disagreement as to whether students should learn to code right away
UCSB - geography there became successful b/c it doesn't let culture wars happen; you need to just come up with and carry forward impt ideas; BUT hard to talk to colleagues about the SPECIFICS of research they are doing in GIScience, the language is so different that the social science colleagues can't quite understand, but at least they respect
Serge - analytical tools as what you use to DO research as opposed to what you do research ON; good opportunities to build interdisciplinarity- a lot of work goes into disentangling the jargon - but the code can actually demystify - code as text - a way to facilitate the research - you can learn from the code. Granted there is tons of jargon around coding
Forrest - finding a way to start the conversation w/o being intimidated or turned off by the differences in backgrounds, approaches

Renee has a joint appt - colleagues in law, philosophy, engr, urban planning - faculty meetings are really long! :-) they have given up a bit on common understanding - they work on respect in advancement; in joint projects they need to respect each other's approaches and that advance each person's field
To wit - digital humanities - hard to find projects that advance data science as much as humanities

Christopher Peters: "Why are you learning R, you'll never get a job with this. You need to learn SAS."
His university created a data science program around SAS and “debased” open source.
Dawn: this should not have happened. Industry should not mistreat university programs in this way nor should academia bad-mouth industry.

Werner: Hybrid solutions can be powerful - go for the best solution regardless of open or closed

Open source as the only way to reproducibility is a myth
Science means that our data, our thinking our reasoning, and hence our code, needs to be understandable
Commercial tools sometimes do the best and
Commercial software is tested and verifiable

Serge: Proprietary vs open debate is over
Open *science* is the movement - scientific publishing, teaching, sharing

Dawn on open source at Esri, how its needed, how it pushes Esri to be better

Renee - open source comes out of a concept that is gendered
The controversy about women's code on github

Make allies in IT divisions to support your instructional needs

---

Recognizing that graduates will go on to work in both academia and industry, how best to prepare them for success in both worlds?

Renee ran AAG Disrupt GEO - Stamen, CartoDb, MapBox, and academics to interact with each other
What do undergrads in geography need to get a job at these kinds of companies?
Silicon Valley researchers give lectures by Skype in her courses

Forrest. - 5 years down the line what is working; what can we think about now that will be important 5 years hence that students need to know
TAMU and relationship with oil/gas industry. They went to GIS professionals in oil and gas companies and asked them what skills do you need, what don't the students have that we should equip them with? Oil and gas folks said that critical thinking skills are most important (they can learn to push whatever buttons as long as they can think critically). Here is a dataset - what's wrong with it (coordinates that put Texas in the middle of the Pacific Ocean)

GIS practitioners from the real world come to UCSB - they said the same - critical thinking
Werner Communication skills!!! The more we push the computing hacking writing scripts, the more we are likely to get characters, types, skills, profiles - cannot make a clear case to mgmt that this is the problem to solve and why

Serge -personal skills are impt - most impt open source projects have built **communities**
Smart kids just want to go away and code - in the real world, interpersonal skills

And yet CartoDb, Stamen, etc. said they wanted software coding, version control, data mgmt
But get a github account - it's your online portfolio, it's proof of what you are doing. Your github history may be as impt as your CV

LInda Peters: Esri works with Starbucks, Cisco, - she hears the need for critical thinking, communication skills; they assume the tech skills
TEAM WORK skills

An effective way to frame it is to become a professional

Communication by email, making presentations, in addition to doing a project, managing your data

Students have no idea how to run a business - so entrepreneurial training is needed - they need that in order to be a player in that world

Geog at SF state - panel of recent graduates to older graduates who come back and speak to the students - they come from academia, industry, government

Grad student who has consulted for start ups and companies - the way students get challenged - need correct technique, justify in context of a project or deliverable, and needs to. Be profit generated - why does your perspective view this as the impt Q

Sara Fabrikant - stats, programming, etc. Who should teach this? Geographers teaching Java, Python, spatial stats? Outsource to other departments? Reading and writing from by human Geog

What are the basic ideas? Foundational ideas?

In business you have to be able to think bottom line - drive revenue or save money - compelling business case - 5-minute elevator speech
Professionalism, business skills, foundational ideas?

The nature of a GIS professional or job is so different than it has ever been
Goldberg Scraped GIS postings to find out - web, db manager, computer science or related field - how to emphasize or keep the spatial perspective; not just managing databases; spatial is the core; how to keep the spatial in there with 6 required programming languages and software packages

Back to Sara's Q -

- Werner: should be done by those who know what they are talking about - could be outsourced or not - but in the end it's better if geographers do it - geographers can apply it and see how it applies to their own field - instructor who knows both sides, brings the notion of program to the specific problems of geography
- Renee - Durability: what value are we adding to this field as opposed to just making software engineers. Should we be investing more in geostatistics - would have far fewer students if we did - are we undercutting ourselves if we focus so much on these database issues
- How to cope with imposter syndrome - they will encounter brilliant people in a special area and feel inadequate, not good enough
- And says Karen - it is geography - the spatial sense of it all - it's about geography - however we are representing. WE want to do it but we want to do it for *geography - what does it mean, what's it about, not just getting the code right*

Are our answers today much different than what would have been said 10 years ago. What is different now
Experience from NSF panels - proposals got rejected for using proprietary datasets. Now it's fine - it's fine to use Twitter datasets, for example

What programming means today. 15 years ago Java or C++ maybe. If you didn't learn Fortran it didn't count. Today, learning curves are much lower. we can't argue that a geographer doesn't need to be able to hack or script. They are not able to use the data, either business, science, or government
Renee - Data looks unbelievably different than it used to - positional accuracy, authenticity, streaming data, stars, geostatistics, no innovative ways yet to sample streaming data that maintains topology. Where we get it from, how we evaluate it
Karen - the diversity of everything we need now. Software was command line, than GUI, one thing evolving - now many things evolving and all are different - can't put arms around technologies and skills need, with a new one behind me that we haven't heard about yet - how to focus
Forrest - 1st course 8 years ago - we hid the code so you don't have to deal with it - now a black box is heresy - so different from GIS that we need to teach in the future

---

What drivers might shift academia toward recognizing & rewarding "data scientists" in geography?
-Renee - a less corporate university - too much bean counting - how does what we do look different from what everyone else is being expected to do
Serge - public funding - we are over producing PhDs because of that de-funding - immoral as students have no job opportunities - how we respond to pressures is another panel; now postdocs are being produced in social sciences as much as bio sciences b/c there are no jobs for them - exploitation of postdocs - cream of the crop with huge bottom tail of unwashed masses
Renee - rewards for producing students that go into industry? She is not being rewarded
Werner - we are the drivers; the way to make this more respected and respectable is to go beyond the analysis of tweets but to solve a real physical problem, climate, ask Qs that you couldn't ask before (Dawn's PNAS paper) - insights, knowledge, sharing, clearly communicating - data science should be self-evident; should not do it as an end in. itself
Karen - moving our PhD glut into industry is the solution - let them grow into big people at Google that then give the university a ton of money!

- consultancies - play the same money game as the university

Matt - privilege of academy is that there does not always need to be a monetary return on investment - what kinds of questions will be imposing
Werner - as heard from a big company in Germany If you in academia do the same thing that we can do and calling that science you are not doing your job (like cyberGIS reinventing what AGOL already does)

In the back - suggestion - build an open source platform that others can contribute to - build on it - take other people's programs - gets attention from big companies - students can hack on it - helps in the classroom
Put a kernel of code out there, come hack with us, the company gets the work done and makes a ton of money

Jerry - how do we gain the respect in academia - vs how do we do our job better
How do we present ourselves is more of the question

We have built a model of the whole world, pretty good, we hold all this data and let other people make discoveries, we become the clerks of science not the ones who are developing the theories, the discoveries, - you can't get the same rewards that way

Andre - physicists have left physics and gone into social science network analysis - publishing in Science and nature - they can think abstractly and compute,
Jerry.- a matter of branding - human, physical, regional
Renee

Science communication sense of urgency - what is the sense of urgency for geography
STEM - does involve

Werner - Science is about understanding - how data science and computing advances and improves understanding
Old saying "Scientists build to understand while engineers understand to build" - we have to close this loop - have to understand broader impact, with social sciences, arts

---

Whither "data science?" Where does it fit within the structure of the university?

Serge - goals of science have not changed - old wine in new bottles (Dawn blog - have I been a data scientist all along?) pigeon holes - geomorph
Our models in geography are broad and deep
Werner The corollary is that data science belongs everywhere -
Renee - But does that bring you tenure? A political context - legitimacy going back to Dawn's 1997 annals paper - GIS, Tool or Science - a political question and also what questions are we asking
Karen - data science is out there and the train has left the station - they do something, skill sets, (reference Twitter accounts, Peter Fox,) they have tremendous functionality in the world today - we should not ignore it, we should not brush it away
OK, so what is geography? :-)
Stats wrestling with this - SciPy conference thinks they have]
Back to what are the Qs we are wrestling with in science
Galileo built his own telescope - we built it and we let others look through it (Dobson agrees and his ArcNews article)

Library science, info science, data science - look at who is on your campus and think about a dual major to grab their information
Data curation, mgmt, preservation - they have done this and could add to the potluck
It is a different profession, ideas and skills

Name of Symposium is human dynamics research was to bring the focus on the human side

Duane Marble asked this at lunch - big difference in recognition for people who do field work - they are considered to be doing science - but if you disappear in front of your monitor for a month is that the same - both get pubs - but if you don't get recognized toward tenure for doing the code that's a month
Other people use the code to make the discoveries, that's a big sacrifice - and that's why it's under produced

Not production quality, can't replicate, can't produce things

May Yuan - another culture change has to do with journal publication - publishing of code and data with DOIs; 99% of researchers resist this - we need to look at ourselves and are we willing

GIScience 2016 - will be rebrand extended abstracts as short peer-reviewed papers. Proceedings will not distinguish between these abstracts and full papers.

How do we align our investment of time with our reward system?

-- Panel notes prepared by Dawn Wright (all errors/omissions are hers)
Please contact Dawn (dwright@esri.com) if wishing to use or distribute these notes.
http://dusk.geo.orst.edu/aag16-darkside.html