

Collaborative Chaos and Unruly Passions: New directions for scholarship and real-world engagement

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Good evening. It is a great pleasure to be with you tonight to talk about the essential elements of that unique type of cross-cultural exchange known as interdisciplinary research.

I'd like to add a sentence or two to that very fine introduction. Chemistry was my undergraduate major. I followed that with a master's in chemistry education, and taught chemistry and calculus at a small college for 10 years.

Continuing true confession, I have spent many hours in the biochem lab, although I have the warmest spot for quantum mechanics. My background in science gave me an understanding of systems that still serves well.

Now at Emory, I teach a graduate seminar on the American university and its place in our society. I have PhD students from across the university, and they all read Part I of Richard Rhodes' *Making of the Atomic Bomb* because it shows clearly how a new field of knowledge develops.

Let me also say that I was on the campus of a major Chinese university on April 16, and there was an amazing outpouring of grief and sympathy there. Like us, the scholars and leaders I met realized that the tragedy here was a crime against universities.

As I witnessed a sadness that transcends nationality, I was touched by the way those of us who teach and produce knowledge are connected around the world. In coming together and healing each other, in acknowledging while moving forward, you are an inspiration. Like many around the world, I admire your grace and strength.

As you probably know, interdisciplinary collaboration is more than just trendy—it has become requisite in the academy as scholars cross disciplinary lines to address important problems that extend beyond the scope of their traditional knowledge fields.

These programs link the needs of society with the special capacities of universities. And they help institutions retain their most prominent scholars, recruit top thinkers to join them, secure external funds, and increase prestige.

The National Institutes of Health recently announced a fundamental change in its research culture, positing itself as a "collaborative entity" that will bridge gaps between individual areas of research and awarding \$210 million in grants meant to foster interdisciplinary investigation.

The National Science Foundation's IGERT awards (Integrative Graduate Education and Research Traineeship Program) to celebrate you—scientists and engineers who have the "interdisciplinary background" to be "creative agents for change."

The NSF says the intent is to encourage scientists to engage in a "fertile environment for collaborative research that transcends traditional boundaries." A few of the IGERTS given out this year include grants for these interdisciplinary programs:

- Training in Bio-centric Robotics, which gathers mechanical engineers, bioengineers, and computer scientists to create robots that assist people.
- Bio-resource-based Energy for Sustainable Societies, which draws in doctoral students in both forestry and engineering, and applies Native American philosophies.
- Water in the Urban Environment, which involves 32 scholars from nine departments and six partner institutions, including ecologists, economists, engineers, and policy-makers.

And, of course, Virginia Tech's own outstanding work, as one of the few universities that have received four IGERTs for:

- Macromolecular Interfaces with Life Sciences (MILES);
- Integrated Research and Education in Advanced Networking;
- Macromolecular Science and Infrastructure Engineering; and
- Exploring Interfaces through Graduate Education and Research (EIGER).

As if financial incentives to explore these partnerships aren't enough, these cross-fertilizations are already producing results. They are creating new drugs, renewable energy sources, and ways to help bring clean water to the poorest countries. They are also producing computers that are conversant in the language of the human genome, robots that can perform surgery, and plays about the history of science.

A colleague of mine at Emory, Dennis Liotta, is a chemist and a co-inventor of an anti-retroviral drug now being used by 80 percent of people in this country with HIV to keep the virus in check. He worked with immunologist Raymond Schinazi to develop the drug, Emtriva, something each feels he could not have done without the other. Alone, they were merely brilliant scientists in their respective fields. Together, they are something even more spectacular.

The best science is interdisciplinary because the most intractable problems are interdisciplinary. People are stepping outside their comfort zones to do this kind of work.

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The traditional university, with its various departments and budgets and administrative hierarchies, is not set up to support these exciting new ventures that—by their very nature—smash all sorts of artificial boundaries. Some find this daunting, or even threatening.

But this is important work because our increasingly complicated world is demanding complex solutions to its most pressing problems. Addiction, war, infectious disease, starvation, infant mortality, global warming, obesity, religious conflicts—these are not issues that lend themselves to narrow, one-discipline answers.

This is not to say that solutions cannot, in the end, turn out to be simple: A helpful molecule accidentally discovered, a medicine contained within a rare species of fern, a few drops of chlorine, a filter that strains out the flea that causes Guinea worm.

But effective, sustainable solutions rarely emerge from a traditional, limited, and linear train of thought. Rather, the magic seems to be occurring at the intersection of disciplines, the fusion and fission of subjects crashing into each other—science and technology; law and religion; playwriting and physics; chemistry and virology.

The energy of synergy is what we need.

And there will be no standing outside this party. Wallflowers or no, the dance has started, and it is actually quite important to understand how and why this is happening, and to realize that there are key elements to creating successful, supported interdisciplinary initiatives.

Interdisciplinary initiatives—What is working and why?

My team and I have been field researchers, in a sense, carefully observing cross-disciplinary initiatives that have proven successful at major research universities across the country. I'd like to share those observations with you here tonight.

But first, let me tell you about studies we conducted that show how universities—yes, even those that have reputations as being stuffy and inflexible—are tearing down walls and making new discoveries.

First, we conducted a qualitative examination of top research universities including Columbia, Harvard, Princeton, Stanford, and others, where we asked top scholars and other leaders what is working and why.

The study consisted of comprehensive interviews during site visits that lasted several days. To set up the interviews, we sought out leaders and scholars who seemed to be accomplishing important change and I met with twelve to twenty people on each campus, one-on-one, face-to-face. Although some consider these

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elite private institutions to be staid or even stale, I observed several outlooks and practices to contradict that view.

We also tracked university-level changes at the 62 research institutions in the U.S. and Canada that compose the Association of American Universities (AAU). In fact, I began this inquiry about 10 years ago after sitting with other AAU representatives in an annual session called the Round Table.

There, one representative from each institution—half public and half private—takes exactly three minutes to share news about big issues on campus. These are not the official versions—we report on those before the meeting. These are the back stories, and some of the tales are very frank.

As the 90s progressed, these back stories revealed a new divide between the major public and major private institutions in this country. After becoming more and more similar through the 70s and 80s, two forces were driving them apart--the incredible endowment growth the privates were enjoying and the increasing constraint of state regulation on the publics.

To learn more about how progressive private universities were using their new strength, I visited 15 of them to ask what was working and why. I learned that these universities are taking steps to increase both their focus on strategic areas and their flexibility to act. Rather than developing academic programs incrementally or across the board, these universities are creating programs to advance specific ambitions.

Some, for example, use income from patents and licenses to speed the development of faculty research merely because it is promising. Then they use the projects to increase the distinctiveness of the entire institution, presenting it as one university, and not just a collection of schools.

My team and I also looked in-depth at eleven successful cross-disciplinary programs at Emory, a relative newcomer in the AAU. First we reviewed more than forty programs that met our requirements of featuring a significant research focus and crossing at least two schools of the university. Then we selected eleven initiatives for in-depth study.

These ranged from large centers that receive millions of dollars in external funds to faculty groups with modest internal support. We conducted open-ended, semi-structured interviews with leaders of the eleven initiatives and used program literature to supplement the interview data.

Though the programs ranged widely in scope and content, we were only able to interview leaders of reasonably stable initiatives. Unfortunately, representatives of

initiatives that failed did not come forward. Although we searched for such narratives, people were reluctant to discuss negative experiences.

We asked:

- What factors shape the evolution of cross-school initiatives?
- What conflicts do they encounter?
- And what benefits do they offer the university, faculty, and those beyond the university's own walls?

Overall we learned that strong programs arise out of the interest and passion of scholars rather than marketplace forces or other internal drivers like routine planning exercises. The main factors behind successful programs include:

- Founding leaders who are scholars with vision and political skill
- Existing collegial networks
- A problem-based research mission
- Early central support and "seed" money
- Fluid and flexible structures

I will detail each of these findings in turn.

Scholar/leaders with vision and political skill

Most of the successful initiatives started because one or two scholars were committed to an idea and worked on it together, day after day, in addition to their regular departmental responsibilities and for little tangible reward—at least initially.

The psychoanalytic studies program at Emory is a good example of this factor. With a background in both anthropology and psychoanalysis, the founder naturally viewed psychoanalysis from both clinical and academic perspectives, and he brought together faculty from a medical institute, law, history, anthropology, and literature to discuss psychoanalytic thought.

To build a strong program, he used patience, consistency, imagination, tact—all components of political skill. Said one humanist who led another program: "Dedication to the program as an intellectual project is not enough. I needed political and organizational skill to get this program off the ground!"

"Leading an initiative," a sociologist declared, "requires diplomacy and open-mindedness to "sell the program" not only to potential scholarly participants but also to the "administration and the larger community as well."

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Collegial networks

Successful leaders also drew on established networks of colleagues from different disciplines that extended across the university. Indeed, the *most* successful had relationships that extended across several universities, out into their communities, and around the globe—and they called on these relationships to get the program off the ground.

But the collaborations closest to home proved invaluable in forming discussion groups; negotiating joint appointments; and co-teaching classes on such diverse topics as science and film, and ethics and neurobiology. In one case, a theologian, a biologist, and a physicist team-taught a class that led to a faculty discussion series in science and religion that soon went well beyond its teaching roots.

It is human nature, and one of the perquisites of being inside the academy, to enjoy spending time with people whose work we admire, or find fascinating or provocative. Cross-disciplinary groups are a way to formalize this attraction. Perhaps this is a new area for Match.com to investigate in the future!

Outward-looking research missions

Because it is inherently fluid and flexible, interdisciplinary research seems to be most productive when geared toward finding solutions to outward-looking problems.

This focus connects the passion of the group's leaders, rich networks of colleagues and community leaders, and their collective knowledge and experiences, to a meaningful mission. For example, we studied

- a law and religion program that developed a focus on human rights scholarship;
- a health and society program that gathered scholars, community leaders, and public health officials to address community-based ways to prevent disease; and
- a science and religion program that took up the effects of physician-assisted suicide and genetic screening.

These social missions inspire collaboration across divisions. Ultimately, they use the gains of research to benefit society directly.

Early funding and central support

A majority of the initiatives we studied depended on funding from external sources, including government grants, community agencies, foundations, and other universities.

A domino effect occurred around this type of funding: across the board, small partnerships attracted new players, who wanted to contribute as others joined in.

We found, for example, that seed money from central administrators encouraged the trial-and-error exploration of new ideas, with few formal restrictions. This early help from the provost, deans, or department chairs, or leaders of other interdisciplinary programs suggests that collegial encouragement helps build initial momentum.

Financial support from both inside and outside the university, then, makes for a successful interdisciplinary program. One might think that acquiring funds from so many different sources would be time consuming and frustrating. In fact, leaders told us that relying not on one, but on several financial streams gave them a certain amount of freedom: the diversity of funding sources elevated the initiative's autonomy.

Fluid and flexible structures

The nature of cross-disciplinary initiatives—fragile because they lack the security of traditional departments, yet resilient because they are highly adaptable—cautions against recommending ways to guide their development across a variety of settings. Of course these programs need structures to support them. But any structure should evolve organically to help solve conflicts, not put up rigid fences that create more problems.

We found that structures should emphasize people more than organizational design. We also learned that scholars are most productive when they are free to move in and out of marked territories in search of new ideas and methods.

Overall we learned that interdisciplinary initiatives are more successful when intellectual goals shape administrative structures, rather than the other way around.

Conflicts to manage

And conflicts? Yes, we found those, too. And here they are.

- **Lack of Time:** The initiative leaders and faculty who spoke to us related time pressures to multiple responsibilities, naming coordination and time constraints as the most serious obstacles they faced. Their interdisciplinary work, it seemed, had to be done “on top of” and “in addition to” their departmental responsibilities. The phrases “wearing multiple hats” and being “spread too thin” came up more than a few times. One Harvard faculty member referred to his participation in a cross-disciplinary initiative as his “night job.” Sound familiar? It is very hard to set limits or achieve balance in these demanding roles.
- **Lack of Recognition:** Many leaders named conflicts with departments over access to faculty, and failure to value interdisciplinary work in tenure and promotion decisions as obstacles they faced. Universities may talk the talk, but walking the walk will become vital as cross-disciplinary initiatives earn their stripes and fill the coffers.
- **Lack of Clout:** Often interdisciplinary endeavors lack power within a traditional university structure, or even a coherent voice. They may have no representation on the dean’s council, for example, or lack administrative support, IT support, scheduling capability—even adequate physical space. Existing in the creative ether is appealing only until you need a place to hold a lunchtime meeting that has audiovisual capacity.

Benefits

Happily, the benefits of interdisciplinary initiatives are many—to the university, the faculty, and society at large—and they are largely self-evident.

These initiatives dismantle silos and artificial barriers that separate many schools and departments. They offer homes to faculty who may not fit well within traditional boundaries, yet can flourish in such “outside the box” environments.

They bring prestige and funding to the home institution. They heighten the creativity of course offerings and research concentrations. By pooling intellectual resources, they broaden scope and efficiency.

Indeed, these initiatives lift all boats, in that each involved discipline stands to benefit from the cross-disciplinary research—for example, a computational life sciences consortium might produce advances in the underlying fields of computational techniques, informatics, and biology.

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And, again and again, faculty members tell us that they have deeply enjoyed playing outside their usual sandbox: A humanities faculty member who leads a science and religion faculty group said: "It's just great fun. It's great intellectual stimulation from a lot of smart people around the table. People tell me that they look forward to this more than anything each week. Personally, my whole academic life has been radically enhanced by the opportunity to talk with physicists and medical doctors." By overlaying new patterns onto old, the spaces for intellectual exchange and scholarly innovation can be amplified beyond our imaginings.

Although we studied private institutions to develop these findings, they hold good news for public universities as well. The fuel for the power I am describing flows less from endowment funds than from new outlooks about *how* to do things. A firmer financial picture helped private institutions discover these strategies, to be sure. But the methods themselves are not costly—and publics can certainly draw on them as well.

Collaborative chaos, unruly passions

Interpreting this study and others we conducted, we recognized the important roles of those who navigate borders well. Ultimately, these creative leaders look for hidden strengths purposefully and push them forward to evolve into something new.

Comfortable with a certain level of chaos, these leaders know, for example, that the academy can advance when apparently disorganized groups of scholars pursue all kinds of unrelated work, or when unconnected coalitions of people and projects shape the future in seemingly random ways.

Beneath this chaotic activity we found the quiet (or sometimes noisy) churn of productive action and a determined order that emerges, it seems, despite itself. We also found scholars who are working hard to create openings in the walls between disciplines, and leaders who are using those openings as assets to help the institution mature.

Rather than requiring more effort, such strategies free the university and its key actors to achieve a valuable degree of flexibility. This is not to say that the leaders are discussing the merits of chaos in their planning sessions! But it *appears* as if they are, and this interests us.

And so we asked: *How* are they moving forward? We looked deeper and saw that leaders who welcome potentially chaotic activity can help the academy advance despite pressures to retain the status quo. They know that when structures become

confining, scholars will go around or even through them to accomplish their original goals and more.

Colleagues who meet when they join a network to pursue one question may go on to compete for grants in other areas, team teach new classes, or write articles or books together. The open-ended design of the networks can produce myriad combinations of knowledge and skill.

And so these leaders encourage the university to grow by helping faculty and resources to circulate from department to department, center to center, and university to university. This capacity to move freely marks a progressive institution and signals an evolutionary leap in structure that is similar to the development of some cities from village to metropolis to global city.

For a while, I have been fascinated by similarities between the university and the global city that sociologists and economists are describing. Rather than *defining* the ways large numbers of people live and interact—these new forms of cities are being *defined by* those forces to better fit the needs of the various communities they contain.

While the village represents a close-knit enclave where stakeholders share basic values, and the metropolis features a strong bureaucracy, the global city relies on networks, blurred borders and strategic projects to move forward. Universities that embrace this “global city” model welcome a certain amount of chaos. They will—I believe—reap bountiful rewards.

Asking how progressive leaders encourage chaos led us to recognize some president's transitions from CEO to academic partner and entrepreneur. Whereas their predecessors might have functioned comfortably in a web of bureaucracy, these presidents are joining with provosts, deans, faculty, and other willing partners to challenge not the values of the academy, but the value of its structures, which have become so embedded and inflexible that they may block the very qualities they should foster and reward—academic freedom, creativity, risk taking, and scholarly initiative. In some cases, these leaders' outlooks are so different from previous generations that I believe they are encouraging yet another evolution—from institution as ivory tower to institution as problem-solver with the world.

An international community of graduate business students, professionals, and faculty known as Net Impact is one such example of this exchange. Seeking ways to use the power of business to create a better world, Net Impact covers issues like corporate social responsibility, environmentally sustainable business and social enterprise—topics that are often forgotten in conventional coursework, but are essential in modern business practice.

Net Impact chapters assisted the United Nations during the International Year of Microcredit in 2005, helping micro-entrepreneurs (largely in developing countries) use loans as small as \$100 in some cases to develop thriving businesses—from tailoring cooperatives in Afghanistan to cell-phone companies in Rwanda—that contributed to stronger local economies.

This is but one case where scholars and their work in the world are at the heart of this evolution. It is no longer useful, or even accurate, to say that the contemplative approach of academics is divorced from the tangible needs of the rest of society.

And they meet needs of the institution as well. We have seen the networks we have investigated increase institutional prestige, advance commercial relationships, encourage new designs in teaching and learning and introduce humanistic values into public debate.

Through press releases and strategic marketing, their institutions are using the differences these programs make to answer donors, trustees, and prospective students and faculty—who want to know what the university is doing for those outside its walls. Doctors without Borders, meet Universities without Borders!

These evolutions—from solid walls to permeable boundaries, strict hierarchies to creative disorganization, top-down imposition to organically grown support, and inward-gazing to outward-reaching—benefit not only scholars and disciplines, but also universities themselves and the vibrant global village they both resemble and serve.

Thank you for being here tonight and for your great work across borders. It would be wonderful to learn more about the forces that bind you as scholars or keep you apart. Let's have some observations and questions to discuss.

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