2014 RICHTER SCHOLAR PROGRAM FACULTY PROPOSALS

Project descriptions are arranged alphabetically by faculty last name within each Richter Option.
Richters do not have to work on projects linked to their future intended major.
Richters should choose projects that most interest them irrespective of future major.

RSCH 181: Independent Research Experience I
(This is Option I and it is a three-week Session)

1. Prof. Dawn Abt-Perkins (Education/Writing Programs) 1-2
2. Prof. Emilie Amrein (Music) 1-3
3. Prof. Todd Beer (Sociology & Anthropology) 1-2
4. Prof. Elizbeth Benacka (Communication) 1
5. Prof. Verena Bonitz (Psychology) 2
6. Prof. Jason Cody (Chemistry) 1-2
7. Prof. Shubhik DebBurman (Biology/Neuroscience) 2-4
8 &9. Prof. Les Dlabay (Economics/Business) **TWO PROJECTS** 1-2 each
10. Prof. Scott Gruenbaum (Chemistry) 1
11. Prof. Matt Kelley (Psychology/Neuroscience) 2-3
12. Prof. Susan Long (Psychology) 1-2
13. Prof. James Marquardt (Politics/International Relations) 1
14. Prof. Dustin Mengelkoch (English) 1
15. Prof. Don Meyer (Music) 1-3
16. Prof. Desmond Odugu (Education) 1-3
17. Prof. Davis Schneiderman (English) 1-4
18. Prof. Alex Shingleton (Biology/Neuroscience) 2
19. Prof. Enrique Trevino (Mathematics) 2-4
20. Prof. Naomi Wentworth (Psychology/Neuroscience) 3
21. Prof. Dawn Wiser (Chemistry) 1-2

RSCH 182: Independent Research Experience I

1. Prof. Jason Cody (Chemistry) 1-2
2. Prof. Shubhik DebBurman (Biology/Neuroscience) 2
3 & 4. Prof. Les Dlabay (Economics/Business) **TWO PROJECTS** 1-2 each
5. Prof. Karen Kirk (Biology) 1
6. Prof. Desmond Odugu (Education) 1-2
7 & 8. Prof. Davis Schneiderman (English) **TWO PROJECTS** 1-2 each
9. Prof. Alex Shingleton (Biology/Neuroscience) 2
10. Prof. Enrique Trevino (Mathematics) 1-2
11. Prof. Dawn Wiser (Chemistry) 1-2
12. Prof. Benjamin Zeller (Religion) 1

RSCH 181 (OPTION I, THREE-WEEK)

PROJECT 1

Professor Dawn Abt-Perkins (Education/Writing Programs)
Johnson Science Building B 175A
Ext. 5232; email: abtperkins@lakeforest.edu

TITLE: ***Poverty and Education*** (1-2 students)

The US now ranks no. 1 in child poverty in the world. Yet, little discussion is taking place on a national level about how school and teacher education reform should be shaped by poverty. Should schools, classrooms, and teachers' actions differ for students from high poverty the way they do for children with disabilities or other limiting learning conditions? What does research tell us are the effects of poverty on learning and schooling processes? What reforms are currently being discussed and from what perspectives?

What students (1 or 2) will do:

Basically, this is one of the literature reviews for my book on teacher education reform in high needs schools. To this end, students will

- Create an timeline of educational reform initiatives in relation to poverty, going back to the "War on Poverty" to the present day No Child Left Behind (Bush) and Race to the Top (Obama) initiatives. In doing so, discuss how learning and teaching conditions are defined and how the challenges of poverty are defined.
- Do an annotated bibliography of the "best practices" reform literature (including but not limited to the US Department of Education website) in teacher education, teaching practices, and school conditions in relation to poverty issues. Discuss how these are related to historical definitions of poverty.
- Code case studies of teachers from Waukegan schools and teacher candidates who interned at WPS (interviews, curriculum projects, and reflective writings, classroom observations) to establish how they define the challenges of working in a high-poverty school district.

PROJECT 2

Professor Emilie Amrein (Music)
Reid Hall 210
Ext. 6024; email: amrein@lakeforest.edu

TITLE: Building the Bridge: Constructing an Educational, Arts Outreach Program Linking Peregrine Vocal Ensemble with Students in Chicago Public Schools (1-3 students)

Peregrine Vocal Ensemble tells stories through choral music in imaginative performances that engage audiences and connect communities. This twenty-four voice ensemble was founded on the core belief that we can better navigate cultural difference, reconcile conflict, and inspire empathy through narrative-based artistic expression. Peregrine concert programs feature the thoughtful juxtaposition of historic and contemporary repertoire for the human voice. The ensemble is comprised of professional choral singers from the Chicago area who have a deep commitment to narrative-based programming.

During the summer of 2014, I plan on launching a collaborative arts outreach program with students in the Chicago Public Schools. The thrust of this program is to introduce the idea of narrative-based choral programming to high school students in neighborhood schools throughout the city. The project will involve several steps; first, a select group of students at our partnering high schools will collaborate with a mentor poet to transform pieces of narrative writing (authored by students at each school) into singable poetry. Then, Peregrine composers-in-residence will set these texts for their respective high school choirs. Finally, we will produce a festival performance where these pieces will be premiered by the high school choirs, with other repertoire fitting a chosen theme. Peregrine Vocal Ensemble will host this event and perform with all of these students on a final song.

I am looking for three Lake Forest College students to help me launch this program during the first summer session. We will be working in collaboration with the students and teachers at these three schools in the city and will regularly travel into the city together to facilitate the collaboration. Additional work will involve choosing the theme for the festival program, soliciting partnerships with mentor poets, and publicizing the project at various media outlets across the city. Students will earn credit for completing required tasks as assigned.

The long-term timeline for the project is:
Summer 2014—initiate contact with high schools, conductors, composers, and poets
Fall 2014—rehearse festival program repertoire, get texts into poetic form
Winter 2014—poems to composers, composers set music for high school choirs
Spring 2015—high school choirs rehearse premieres, festival performance with all choirs

PROJECT 3

Professor Todd Beer (Sociology and Anthropology)
Hotchkiss Hall 209
Ext. 5253; email: beer@lakeforest.edu

TITLE: Climate Change on College Campuses: Our Carbon Footprint and How Other Colleges are Reducing Emissions (1-2 students)

Despite the evidence that unabated climate change will result in disastrous consequences for humans and other planetary species in the coming decades, the US federal government has failed to adopt strict climate change emissions reductions targets as part of either a global treaty or national policy. However, many subnational institutions (states, corporations, organizations, and colleges) have taken voluntary action to subsequently reduce their greenhouse gas emissions. The research for this Richter proposal focuses specifically on the actions and commitments of college and universities in the U.S. The actions these institutions are taking include the calculation of their carbon footprints, commitments to reduce emissions, and divestment of their endowments from the fossil fuel industry. Why have some colleges and universities taken such actions and others have not?

All of the following data collection options are rooted in exploring the social structure, cultural norms, and institutional conditions that drive adoption (or rejection) of voluntary emissions reductions. Scholars will be directed to focus on one of the following ongoing elements of research and data collection.

The Richter Scholar(s) for this project will directly assist in the following research:

1. **Completing the collection of carbon footprint data of Lake Forest College.** This will involve completing a database of primary fossil fuel energy use by the college. Additionally, the scholar will work with me to explore and possibly develop a system of on-going collection of this data so it becomes more institutionalized into our campus community's knowledge base. Finally, the scholar(s) will work with me to research the

possible reporting mechanisms, so knowledge of the college's carbon footprint becomes a motivating factor for its reduction by the campus community.

2. **Beginning data collection on the adoption of *The American College & University Presidents' Climate Commitment.*** This research element will explore variables and collect data that attempt to explain why some colleges have chosen to adopt the commitment and others have not. Who were the early adopters and why? What type of institution is resistant to adoption?
3. **Beginning data collection on the divestment from the fossil fuel industry by college endowments.** This research element will explore variables and collect data that attempt to explain why some colleges have chosen to adopt the commitment and others have not. Who were the early adopters and why? What type of institution is resistant to adoption?

The student(s) will learn basics of Microsoft Excel, database management, the basics of climate change, and explore existing literature on the power of civil society and the spread of environmental norms in the US and globally. No formal prerequisites are required. All students who have a passion for learning more about this topic are welcome to apply. I will be supervising and interacting with students 4-5 days a week. Scholars will be evaluated based on their efforts to complete the agreed upon tasks as well as a "final" paper reviewing what they have learned during Summer Session I.

PROJECT 4

Professor Elizabeth Benacka (Communication Department)
Young Hall 214
Ext. 5268; email: Benacka@mx.lakeforest.edu

TITLE: ***The Critique of a Clown: The Rhetorical Function of Stephen Colbert's SUPER PAC*** (1 student)

Project Overview: I am interested in working with a Richter Scholar this summer to help me unpack how Stephen Colbert's 2012 SUPER PAC, "Citizens for a Better Tomorrow, Tomorrow" functioned as a satirical critique of the *Citizens United v. Federal Election* Commission. My academic research centers on the belief that topical humor functions argumentatively in contemporary society, and yet the rhetorical impact of humor is often overlooked. I have argued in other projects that satire uses a double voice, blending intellect and emotion, the comic and the tragic, information and entertainment, reason and creativity. Stephen Colbert's SUPER PAC used this double voice on his television show AND in the public sphere, providing a compelling case study regarding satire's rhetorical potential.

Student Research Activities/Outcomes: I require assistance in locating, transcribing and analyzing the discursive complexity of Colbert's satire. A Richter Scholar can help me in the following ways: 1) Search on-line for appearances that Stephen Colbert made in character outside of his own TV show (e.g. morning shows, radio appearances, press conferences, etc.) and then transcribe Colbert's comments. 2) Identify *The Colbert Report* episodes (available on-line) on which he mentions his SUPER PAC, and then transcribe the segments. 3) Locate, watch and transcribe the commercials produced by Colbert's SUPER PAC. 4) Locate relevant documents on the website created for "Citizens for a Better Tomorrow, Tomorrow." 5) Identify common themes, arguments, strategies across the primary texts compiled from the above research.

PROJECT 5

Professor Verena Bonitz (Psychology)
Hotchkiss Hall 2
Ext. 5258; email: bonitz@lakeforest.edu

TITLE: ***The Woman Problem*** (1-2 students)

In 1951, Edwin Boring, the venerable historian of psychology, attempted to explain the "Woman Problem" (i.e. the underrepresentation of women in prestigious academic and professional leadership positions) by illustrating the subtle biases and career decisions that limit the professional advancement of highly qualified women in academic settings. Studies have shown that female professors, compared to their male colleagues, take on a disproportionate share of student advising, teaching, mentoring, social justice work, and other stereotypically female tasks. However, these laudable activities are in conflict with the reward structure of research universities, where tenure and promotion decisions are predominantly made based on research outcomes such as publications and grants. In order to better understand the nature of faculty's professional contributions and their relation to perceived prestige and professional advancement, it is also important to consider how achievements are represented and publicly acknowledged. Virtually all universities publish promotional magazines and newsletters (such as the "Spectrum Magazine" or the "weekly news" at LFC) that highlight the accomplishments of their faculty.

The purpose of the proposed Richter project is to conduct a content analysis of how accomplishments of male and female faculty at major US research universities are represented in the universities' promotional materials. The findings of this study have implications for how female faculty and their accomplishments are perceived by a general audience, which in turn could reinforce the subtle biases and gender role attitudes that have been shown to thwart women's advancement through the academic rank system.

The students will be working with me on the following tasks:

- Preparing faculty profiles for analysis.
- Defining inclusion and exclusion criteria for the final sample of profiles used in the analysis.
- Establishing coding categories for faculty accomplishments
- Helping me conduct a content analysis of faculty achievements.
- Creating and maintaining databases in SPSS, excel, or other formats.
- Performing statistical analyses in SPSS or excel.
- Conducting literature searches in PsycINFO and other relevant databases.

I will supervise students' activities by holding regular meetings and training sessions. In addition, there are many steps in the process where I will work along with the students as a team. By working on this project, students will acquire important research skills that are applicable to almost all social science disciplines. In addition, they will learn about key concepts in psychological research (e.g., operational definitions, interrater reliability, etc.) that will serve them well in future psychology courses. I would prefer if a student had completed PSYC 110 (Intro to Psychology), but I will consider all students who are interested in the project. My own goal is to eventually publish the results of the study in a well-respected peer-reviewed journal (a possible outlet is "Sex Roles").

PROJECT 6

Professor Jason Cody (Chemistry)
Johnson Science Building A 305
Ext. 5093; email: cody@lakeforest.edu

TITLE: New Instruments for General Chemistry Laboratory (1 or 2 students)

The General Chemistry Laboratory two-semester sequence has been continually updated and improved since its inception. As new technologies become mainstream in chemical laboratories, we must incorporate them into our chemistry courses. New, small-scale, modular instrument packages have replaced more tedious, manual techniques for experiments that range from light absorbance to titrations. In order to incorporate these new technologies into our curriculum, we plan to update and re-work several of our current laboratory experiments.

Students who select this option will work with me to develop, implement, and write instructions for up to four experiments from our introductory chemistry laboratory sequence. We must work together to create instructions for the next generation of chemistry students, keeping in mind their skill levels, ease of use of the instrumentation, and environmental impact of reducing the amount of materials used in the experiments.

Specifically, we'll use the Micro-Lab instrument package to incorporate for the first time the electrochemistry set-up, we'll design concurrent titration experiments that use both the drop counter and pH meter, and we'll use fiber-optic attachments for light analysis in two additional experiments.

Careful record keeping, enjoyment from working with one's hands, and imagination are keys to the success of this project. One year of college chemistry is a prerequisite.

PROJECT 7

Professor Shubhik DebBurman
Johnson Science Building A 201
Ext. 6040; email: debburman@lakeforest.edu

TITLE: Discovering amino acids in alpha-synuclein that regulate its toxicity in Parkinson's Disease (2-4 students)

During summer 2014, the DebBurman lab seeks highly motivated hardworking undergraduates to form a collaborative team with a diverse group of three other upperclass peers that study how certain human disease-linked proteins misfold and if such folding errors can be suppressed or reversed. Proteins are the most diverse class of macromolecules in our cells and their unique functions hold the secret to life. To fold correctly, most proteins require chaperones, which are proteins that help other proteins fold into their proper shapes and maintain their shape. If proteins still misfold, they are targeted for destruction by well-known degradation systems. But some misfolded proteins that such escape quality control, build- up in tissues and cause tragic incurable diseases. With the aid of national grants, we have focused on the protein folding mysteries underlying one such illness, Parkinson Disease (PD), which is caused by the misfolding of the protein, alpha-synuclein. This misfolding somehow selectively kills certain nerve cells that control our voluntary movement, which then lead to PD symptoms. Student researchers in my lab are currently testing several hypotheses that test what regulates the misfolding of alpha-synuclein in PD.

For RSCH 181 (Independent Research Experience I), 3-4 students would create key gene fragment that tests how the amino-end of alpha-synuclein regulates PD pathology. Each student would work on a different fragment. You would learn to make these mutations on the gene and confirm the mutation by DNA sequencing. Next, you would learn to express these mutant genes in yeast models for PD developed in our lab, so that their protein properties can be test in the future. Last summer, Option I Richters created carboxyl-terminal fragments with great success, and these tools are helping current fall and spring BIOL221 students design multi-week research projects in several new ways. I suspect the same benefits will arise from Option I success this year.

In addition to carrying out their research project, Richter students will learn to discuss and present the latest published discoveries through scientific journal clubs, and discuss data at weekly lab meetings. Many past Richters have continued working additional years in these projects, with some expanding them into senior theses, which they often present at national conferences. Over twenty students, including six Richters, have become co-authors in published articles or manuscripts currently in submission and preparation. All lab graduates have gone on to pursue PhD, MD, or other scientific or health professions degrees. Pre-requisite: BIOL120, CHEM115, and CHEM116.

PROJECT 8

Professor Les Dlabay (Economics & Business)
Young Hall 304
Ext. 5145; email: dlabay@lakeforest.edu

TITLE: Mobile Phone Banking and Savings Groups in Africa, Asia, and Latin America
(1 or 2 students)

Project Overview: Hundreds of millions of households around the world lack access to formal banking services. Savings groups provide people in difficult economic situations, not served by traditional banks, with a practical alternative for accumulating capital and enhancing community well-being. These voluntary, community-based, self-managed groups result in increased social capital, improved empowerment of women, and strengthened economic development. Many savings groups make use of mobile phone banking services to receive funds, make payments, and transfer money to others. Cell-phone banking is especially needed in rural areas, where banks are rare and agricultural entrepreneurs need to buy and pay for farm equipment and seeds for crops. Facilitation of savings groups is a vital development tool for organizations such as the Aga Khan Foundation, CARE, Catholic Relief Services, Freedom from Hunger, Oxfam, Plan, and World Relief. The savings groups are often combined with other development activities that may include distribution of social products, such as solar lanterns, and expanding the availability of agricultural inputs, such as seeds and fertilizer. As a result of increased business activity, families and communities have funds available for improved food, water, health care, and education.

Student Research Activities/Outcomes: (1) review previous research related to savings groups and mobile phone banking; (2) conduct library and web research to obtain additional information regarding mobile phone banking and savings groups in Africa, Asia, and Latin America; (3) conduct in-person and e-mail interviews with people familiar with the culture, political situation, and financial activities in Africa, Asia, and Latin America; (4) create a summary document (table and report) comparing savings groups in Africa, Asia, and Latin America; (5) develop a brief PowerPoint presentation or video summary comparing savings groups in varied geographic regions.

Preliminary References

- *Portfolios of the Poor: How the World's Poor Live on $2 a Day* by Daryl Collins, Jonathan Morduch, Stuart Rutherford, and Orlanda Ruthven.
- http://savingsgroups.com; www.trickleup.org/solution/savings-groups.cfm; www.mobilemoneyexpo.com
- ***Savings Groups: What Are They?***by Hugh Allen (www.seepnetwork.org/savings-groups--what-are-they--resources-175.php)
- *Beyond Financial Services: The Permanence and Value of Savings Groups in CARE Kenya's COSAMO Programme* (www.akdn.org/publications/beyond_financial_services_care_cosamo_programme_kenya.pdf)
- ***Savings Groups at the Frontier,*** Candace Nelson (ed.)
- Unserved by banks, poor Kenyans now just use a cellphone (www.csmonitor.com/2007/1012/p01s03-woaf.html)
- Mobile marvels: A special report on telecoms in emerging markets, *The Economist*, Sept. 26, 2009
- The Role of Mobile Operators in Expanding Access to Finance (www.cgap.org/publications/role-mobile-operators-expanding-access-finance)

Mentoring/Monitoring: Students will be provided with readings related to savings groups and mobile phone banking as well as research techniques. A series of research questions will be developed to create structure for research activities. Research meetings (and field research visits) will take place two or three times a week. E-mail updates will be required from students to monitor progress and to provide feedback.

PROJECT 9

Professor Les Dlabay (Economics & Business)
Young Hall 304
Ext. 5145; email: dlabay@lakeforest.edu

TITLE: Impact Investing: Financing Social Entrepreneurship at the Base of the Pyramid (BoP) (1 or 2 students)

Project Overview: Impact investing involves funding companies, organizations, and funds that desire to generate measurable social and environmental benefits along with a financial return. In contrast to philanthropy (no financial returns are expected) and socially responsible investing (negative impacts are avoided but positive impacts are not required), impact investing attempts to maximize social and environmental gains and will accept below-market returns. Successful impact investments requires collaboration among major companies, local entrepreneurs, non-governmental organizations (NGOs), development practitioners, government agencies, and financiers, that range from microfinance institutions (MFIs) to commercial investors. Social business initiatives can include the integration of small-scale producers into value chains, or providing health care or education in areas that lack these services. In addition to the social benefit, a major goal of impact investing is the sustainability and scalability of the enterprises created.

Student Research Activities/Outcomes: (1) review previous research related to impact investing; (2) conduct library and web research to obtain additional information regarding financial social business initiatives in Africa, Asia, and Latin America; (3) conduct in-person and e-mail interviews with people familiar with impact investing; (4) create a summary report of

impact investing in Africa, Asia, and Latin America; (5) develop a brief PowerPoint presentation or video summary comparing impact investing in varied geographic regions.

Preliminary References

- Making Better Investments at the Base of the Pyramid by Ted London, *Harvard Business Review*, May, 2009.
- Where Do Impact Investing and Microfinance Meet? (www.cgap.org/sites/default/files/Brief-Where-Do-Impact-Investing-and-Microfinance-Meet-June-2013.pdf)
- Priming the Pump: The Case for a Sector Based Approach to Impact Investing by Matt Bannick and Paula Goldman (www.omidyar.com/pdf/Priming_the_Pump_Sept_2012.pdf)
- A Portfolio Approach to Impact Investment: A Practical Guide to Building, Analyzing and Managing a Portfolio of Impact Investments (www.jpmorganchase.com/corporate/socialfinance/document/121001_A_Portfolio_Approach_to_Impact_Investment.pdf)
- Global Impact Investing Network (www.thegiin.org)

Mentoring/Monitoring: Students will be provided with readings covering impact investing along with resources on various research techniques. A series of research questions will be developed to create structure for research activities. Research meetings (and field research visits) will take place two or three times a week. E-mail updates will be required from students to monitor progress and to provide feedback.

PROJECT 10

Professor Scott Gruenbaum (Chemistry)
Johnson 311
Ext: 5094; gruenbaum@lakeforest.edu

TITLE*: Infrared spectroscopy of pollutants in exhaust* (1-2 students)

Infrared spectroscopy is a powerful tool in the chemistry laboratory, and it can be employed to detect low concentrations of various byproducts of combustion reactions (*e.g.* CO, O_3, N_xO_y compounds, or unburned hydrocarbons from gasoline). In the department's Senior-level Instrumental Analysis course (Chem 410), students use this technique to investigate potential pollutants in the exhaust from their cars. However, due to the efficiency of catalytic converters in modern automobiles, the concentration of most of these pollutants is (thankfully for the environment) quite low, and students typically only observe water vapor and carbon dioxide. For future years, it would be beneficial if students could measure spectra that actually contained observable amounts of various pollutants. As such, I would like to investigate the infrared spectroscopy of exhaust from other (possibly dirtier) combustion sources in order to provide a more educational laboratory experience for future Chem 410 students.

During a three week research experience, a Richter Scholar would 1) learn about the practice and theory of gas-phase infrared spectroscopy, and 2) take spectra of exhaust from many different sources, with the goal of determining the potential pollution content of each. The student would also take IR spectra of prepared samples of pollutant gases in order to assist in identification of the spectral features. As I believe it is beneficial to students to actually see the molecular vibrations responsible for the measured spectroscopy, the Richter Scholar (and

possibly future Chem 410 students) might also perform simple theoretical calculations on the observed pollutants. These computations provide a molecular movie of the relevant vibrations and help students make the connection between ideas about molecular shape presented in General Chemistry and the experimental measurements. As such, the ideal student for this project will be one who has completed the Chem 115 and Chem 116 sequence and who is interested in learning more about chemical instrumentation and its application to the environment.

PROJECT 11

Professor Matt Kelley (Psychology and Neuroscience)
Hotchkiss Hall 3
Ext. 5262; email: kelley@lakeforest.edu

TITLE: The Dynamics of Human Memory Retrieval (2-3 students)

Much of my recent research has explored two counterintuitive memory phenomena (i.e., part-set cuing inhibition and collaborative inhibition) that, despite their outward differences, might arise from the same causal mechanism. Part-set cuing inhibition refers to the finding that hints often *impair* memory, whereas collaborative inhibition refers to the finding that people remember less information when recalling as a collaborative group as compared to a nominal group (two individuals who recall separately, but then have their non-redundant performance combined).

Researchers have suggested that both phenomena arise, at least in part, because of *retrieval strategy disruption (RSD)*. In brief, RSD presumes that people have their own idiosyncratic strategy for encoding and retrieving information, so when they are given cues (either from the experimenter, in part-set cuing, or from their partner, in collaborative inhibition), these cues interfere with their desired strategy and impair memory performance.

I've published four recent articles and have a few active lines of continuing research on these topics. During the 3-week program, I intend to introduce students to the general issues and methods in memory research. Then, we will work together to read and synthesize the recent literature on the aforementioned topics. I'll teach them how to analyze memory data, using data from recent experiments in my lab. Finally, we will design and prepare (and possibly pilot) 2-3 studies that will be run in the fall when the Psy 110 participant pool returns to campus. .

With luck, the students will continue to be interested in this research and will join me in my lab in the fall as proper data collection commences.

PROJECT 12

Professor Susan Long (Psychology)
Hotchkiss Hall 13
Ext. 5247; email: long@lakeforest.edu

TITLE: Community Partners Ending Violence Against Women (1-2 students)

Violence against women and sexual assault are major challenges facing America. The Center for Disease Control (CDC) estimates that 25% of women are victims of sexual assault or attempted sexual assault. Local social service agencies work to end these issues through education. This summer I will be continuing work with a local coalition (up2usQSI) of counselors, advocates, and interested parties who provide trainings to local organizations about gender stereotypes and sexual violence. My role on the coalition is to evaluate their programming. Richter Scholars will help process surveys and enter data, run basic analyses, and build tables and reports for the

coalition. She or he will also help with the process of writing up results for publication. The student would conduct literary searches and begin processing those articles. An ideal Richter Scholar would have completed Introduction to Psychology and one course in the Women's & Gender Studies or Social Justice Minors, but all students passionate about this topic are encouraged to apply. For more information about the coalition, visit www.up2usQSI.org.

PROJECT 13

Professor James Marquardt (Politics and International Relations)
Young Hall 412
Ext. 5126; email: marquard@lakeforest.edu

TITLE: ***Obama and the politics of openness and transparency*** (1 student)

For the past several years, I have been researching the politics of open government and transparency in the United States, during the presidency of Barack Obama. Past Richter scholars and I have researched Obama's record on open government and transparency as an Illinois state senator and as a United States senator, as well as the various open government and transparency initiatives undertaken in the first Obama term as president of the United States (2009-2012). For the summer of 2014, I am looking for a Richter scholar to assist me in studying secrecy and national security matters under President Obama since 2009.

There is an irony here. Barack Obama entered the White House with a strong commitment to opening the executive branch to greater outside scrutiny on the part of the American people, to the expedited declassification of government information, and to closer engagement between government and civil society groups on matters of public importance. At the same time, however, the administration has used the pretext of "national security" to veil areas of policy making from public scrutiny, thereby undermining accountability, to both Congress and the American people. The administration has also been quite aggressive in its pursuit of "leakers," that is, government employees and contractors who illegally disclose classified information, as well as the journalists who disclose information leaked to them. There is, then, a disconnect between the rhetoric and policies on transparency and open government as it applies to purely domestic matters as compared to and national security-related matters, especially as they might pertain to foreign "threats."

I want to document this disconnect by surveying the logic behind why the national security imperative has been employed by the Obama administration to withhold information from the public and to punish those who disclose this information – and how this imperative has been employed. More generally, I want to place Obama within the "national security state" model of American policy making, which says that as presidential power has expanded so, too, has the veil of state secrecy.

PROJECT 14

Professor Dustin Mengelkoch (English)
Carnegie 205
Ext. 5275; email: *mengelkoch@lakeforest.edu*

TITLE: ***Renaissance Encyclopedism*** (2-3 students)

This summer I will begin writing an article on the Renaissance encyclopedism of Giorgio Valla (1447-1500). Valla a prominent, fifteenth-century Italian physician and scholar was interested in the interconnections between the many branches of knowledge and thus composed one of the first, printed Renaissance encylcopedias (*De expetendis et fugiendis rebus opus*, 1501). For this study, a Richter scholar will first survey critically a range of secondary literature, in English, on the evolution of encyclopedism (from a circle of knowledge to systems of knowledge) and the subjects that Valla addressed like music, medicine, politics, mathematics, economics, poetics, moral philosophy and so on. Then, he or she will surmise, connect, and evaluate their findings to determine how Valla's work and the topics he wrote about fit in, developed, or challenged Renaissance notions of encyclopedism. Finally, a Richter scholar will also study the material product, that is the two volumes of the text itself. To do this, we will visit the Newberry Library (most likely more than once) to handle and study a copy of it while comparing it with a number of other works of the same type that the library houses.

In the end, there are three goals for this project: One, that a Richter Scholar learns how to become an organized and discriminating analyst using secondary literature and the primary, material text as sources for research. Two, that from our collaboration we will have a better understanding of the challenges and potential outcomes of working on Valla's text setting up a specific thesis for the article. Three, that our new understanding will help us determine whether a longer study of Valla is viable or desirable beyond the article at hand.

PROJECT 15

Professor Don Meyer (Music)
Reid Hall 106
Ext. 5171; email: meyer@lakeforest.edu

TITLE: ***A New Film Music Reader (***1-3 students)

In 2006, I created the course MUSC 266 (*Music in Film),* an investigation into the practices of Hollywood film composers. The next time I teach the course, I would like to have my students read a collection of articles, interviews, and essays about film music, rather than a traditional textbook. I plan to devote time to this project in the Summer of 2014, and I would like to have a research assistant (or assistants) help me locate these essays, evaluate them, and organize them for use for the next incarnation of the course (hopefully, Fall 2014).

The ideal Richter Scholar will have taken MUSC 266 already, but a sharp mind, a musical background, good analytical skills, and an interest in the topic may substitute. The Richter Scholar will dive deeply into the scholarship of film music, evaluating articles, helping produce a collection of materials that will serve the next generation of MUSC 266 students well.

Some of the activities will include:

1. Reading articles and interviews with film composers, and summarizing these each day.
2. Traveling with me to the Balaban and Katz Archive of silent-era music materials at the Chicago Public Library.

3. Helping me decide which films to remove from the videography for MUSC 266, and which films to substitute.
4. Ultimately, helping me produce a new Music in Film Reader for Fall 2014.

Students participating in this project will hone their skills in humanities research, learn about how one constructs a syllabus and reader for a course, and gain deeper insight into the history of film music. This project can accommodate more than one student120 and Chemistry 115 is required, and having a full year of both Biology and Chemistry is strongly recommended.

PROJECT 16

Professor Desmond Odugu (Education)
Buchanan Hall 222
Ext. 5177; email: odugu@lakeforest.edu

TITLE: Re-conceptualizing Education Language Planning in Multilingual Societies
(1-3 students)

Controversies over policies on the language of education in multilingual societies have led to several paradigm shifts – (a) from prescribing monolingualism (one language per individual/society) to multilingualism (multiple languages), (b) views of multilingualism as a resource, not a problem, and (c) approach to language planning as ideologically driven and not purely technical and objective. The resulting approaches or orientations, which view language as a *resource* and a *right* (instead of a *problem*), contain inherent contradictions that make advocates of language diversity reluctant to use them for educational policy and practice. Due to this theoretical confusion, the call for multilingual countries to adopt mother-language based multilingual education (MLB-MLE) often meet resistance among policymakers and educators. As a result, linguistic discrimination persists in most multilingual societies, especially those who abandon their local languages for more dominant languages. My recent research uses ethnographic data to reexamine the fundamental assumptions underlying these orientations to language policy and practice. Previous studies approach language policy as a finished product contained only in official government policy documents. They focus mainly on government institutions (such as ministries of education) as the sole proprietor of education language policy. By overemphasizing official government actions and relying on problematic orientations, scholarly experts are still unable to provide a defensible platform for challenging linguistic discrimination both in industrialized nations with large immigrant populations and in less-industrialize ex-colonies with rich ethnolinguistic diversity.

As a departure from this condition, I have proposed a framework that views language policy and practice as an ongoing *process* of negotiation among individuals and groups with unequal bargaining power. In this framework, governments and scholars are only few of the many groups involved in language issues. Others include grassroots language groups of various kinds, mass media, social activists, international organizations (and their agencies), I/NGOs, religious organizations, and so forth. As a result, government language policies are only tentative tools in a broader *process* of negotiation. The negotiations often highlight the frequently non-linguistic nature of linguistic discrimination (that is, the fact that language issues are not often about language but about the speakers and the ascribed sociopolitical, cultural, and economic status of their corresponding communities).

During my last fieldworks in India, Nigeria, and France, I collected an enormous amount of ethnographic data from research participants representing the various groups listed above. These data provides a good source for

1. exploring the descriptive rationale and theoretical implications of a *process* approach to language planning that involves broader social issues and actors,
2. highlighting the sharp disconnect between current dominant theoretical orientations and actual language planning realities faced by multilingual societies, and therefore
3. providing new ideas for dealing with the contradictions inherent in current orientations.

I seek three (3) Richter scholars interested in how social theories and public policy emerge from empirical data and academic scholarship. They will also see how academic research is shaped by public policies. To be effective in this project, the Richter scholars will receive training on qualitative data analysis. So, they do not need to already have skills in qualitative data analysis.

The Richter scholars will primarily codify already transcribed interview and observational data, and categorize themes that emerge from those data to make them usable in theory building. Each Richter Scholar will work on data from a particular site: India, Nigeria or France. (This will be ideal for students interested in multilingual societies and/or international organizations, such as UNESCO. Comparisons will be drawn to the North American context to help students understand the field of study). Importantly, since current failures in addressing language issues in multilingual societies arise from partly prevailing contradictions in theories, these Richter Scholars will be engaged in work that potentially alleviates real-life linguistic discrimination around the world. Data coding will focus on identifying

1. the nature and scope of language choices at various levels by different individuals/groups,
2. the ideologies that guide those language choices,
3. the networks among language actors,
4. the range of non-linguistic issues that inform language policy and planning across various levels and among different actors, and
5. agency (that is, who has the power to make decisions that affect which individuals/groups) among the various actors and their influence on language choices.

Each student will also be able to explore new themes that emerge from their coding, and work with peers to discuss patterns across the regions under study. During the first week of the program, the Richter Scholars will also review literature in language policy and planning in multilingual societies to enrich their understanding of research in the field. Having three (3) scholars will significantly reduce the amount of literature to be reviewed, since scholars will discuss the materials they reviewed. Finally, while the Richter Scholars will work independently on their area of concentration (India, Nigeria, or France [UNESCO]), they will collaborate with their peers throughout the data coding and analyses process through ongoing discussions and virtual data management.

PROJECT 17

Professor Davis Schneiderman
Carnegie Hall 202
Ext. 5282; email: dschneid@lakeforest.edu

TITLE: Book publicity for DEAD/BOOKS and *War of the Worlds* (1-4 students)

Uncreative writing is a practice of conceptual art that works against notions of traditional creativity, genius, and authorship. Examples of conceptual works in the more-well known sphere of visual art might include Marcel Duchamp's readymades, Andy Warhol's silkscreens, and—more recently—works of Damien Hirst (including his famous shark suspended in a tank of formaldehyde).

In literature, this practice of uncreative writing has roots that extend back to the work of Dada and Surrealist authors, the cut-up experiments of William S. Burroughs and Brion Gysin, and the texts collected by Kenneth Goldsmith and Craig Dworkin in their landmark anthology *Against Expression: An Anthology of Conceptual Writing.*

My recent novels, *BLANK: a novel* (a largely blank novel with collaborative elements, including audio by Dj Spooky) and [*SIC*], a plagiarized text, explore issues of copyright, corporate publishing, electronic literature, and book culture/history. The final work *INK*., will be released in 2014. Further, I expect the 2014 release of a conceptual edition of the classic *War of the Worlds*.

The Richter scholar/s will have the opportunity to further these initiatives by focusing on the packaging of these works and their (social) media presence. What separates such these from that of traditional book publishing is that with conceptual works, the publicity materials are *part* of the product. The book does not begin and end with the printed text because the text is simple a jumping off point for a larger cultural conversation—here expressed in sampled music; a biological pathogen; the possibility of blood mixed with printer's ink; and a library which will be destroyed when readers purchase a text.

The ideal students will have an interest in contemporary literature and experimentation, and enthusiasm for a fast-paced environment of artistic exploration. Not required but welcome is interest or experience in viral marketing, social media, and Search Engine Optimization (SEO). This is a chance to make contemporary art and learn about the independent publishing scene, while connection more broadly with the wider literary world.

PROJECT 18

Professor Alexander Shingleton (Biology and Neurosciences)
Johnson Science Building A 209
Ext. 6049; email: shingleton@lakeforest.edu

TITLE: ***Phenotypic consistency in an inconsistent world: The developmental mechanisms that regulate canalization*** (2 students)

It is easy to be struck by the range in diversity of organisms that inhabit nature. Upon closer inspection, however, it is equally impressive to observe the consistency of form within any particular species. The process by which development generates a reliable body form in spite of

environmental and genetic perturbations is called *canalization*, and is an area of great interest to both developmental and evolutionary biologists. Despite years of research on the topic, however, there are very few biological examples of canalization mechanisms, severely constraining our understanding of how canalization evolves. These mechanisms act by imposing external control on the developmental pathways they canalize, rather like training wheels on child's bike. However, our research has revealed a new class of canalization mechanisms that lie within the developmental pathway that they canalize. We have been using the fruit fly *Drosophila melanogaster* to manipulate these 'intrinsic' canalization mechanisms and determine their effect on the variability of adult phenotype, specifically the size and shape of adult organs like the wings and legs.

This is an Option I Richter project suited to students with an interest in evolutionary biology. We have already generated flies in which the intrinsic canalization mechanisms have been manipulated. The next task is to measure them. This involves dissecting *Drosophila* flies, mounting their body parts on microscope slides, digitally imaging them using a microscope and analyzing the images using imaging software. The research is well suited to students at the very beginning of their research career and will equip them with general skills in dissection and microscopy, as well as specific skills working with *Drosophila*, a major model organism. The project can be completed within a three-week time frame and does not require specific biological knowledge. However, in order to understand the rationale behind the research, students must have complete BIOL120 and a biological inquiry course before joining the lab. The project requires two students who will work together to complete the research. Grades will reflect student commitment to the project, both with respect to data collection and intellectual engagement.

PROJECT 19

Professor Enrique Trevino (Mathematics)
Young Hall 105
Ext. 6187; email: trevino@lakeforest.edu

TITLE: ***Experimental Mathematics*** (2-4 students)

Recently with the rise of computing power, several mathematicians have worked on discovering formulas and patterns by using computers and numerical analysis. One of the relatively recent successes in experimental mathematics was the discovery by Borwein , Plouffe and Bailey of a formula for pi that can be used to find the digits of pi at any position without knowledge of the digits prior to that position. Experimental Mathematics yields itself as an easy way to jump into open problems without needing much background and yet can be very rewarding in terms of learning new things and discovering new theorems.

In this project, I would give open challenges to a group of students. They would select which challenge they want to work with. An example of a possible challenge is an example involving chaotic maps. To attack these challenges I would teach them some useful algorithms. For example, the PSLQ algorithm is a very useful algorithm (used in the formula of pi mentioned above) that can be tailored to many kinds of problems.

My goal would be to have the students learn that they can discover new things without needing to learn as much background. I would also like to have them learn of the usefulness of knowing how to write some computer programs. The programs for this project don't require background in programming but it would be useful to have taken an introductory course.

PROJECT 20

Professor Naomi Wentworth (Psychology & Neuroscience)
Hotchkiss Hall 10
Ext. 5256; email: wentwort@lakeforest.edu

TITLE: What do eye movements tell us about the mind? (3 students)

Are the eyes windows into the person's mind? In this research project, we will use some of the techniques that cognitive neuroscientists have developed, including electrooculography and infrared videography, to measure visual fixations and eye movements. These techniques allow us to record in a precise way eye position and eye movements. Thus, we can see what a person is looking at while the person looks at it.

We will apply these techniques to design empirical studies to test hypotheses about the factors that control how we inspect different types of scenes. For example, one project might entail designing two different "textbook" pages and then determining which style of information presentation is related to more effective reading strategies. Another project might entail designing an interactive video game and using it to study people's ability to learn where they should look and when they should look there to maximize game performance.

There are three goals of the project:

1. To learn first-hand about how cognitive neuroscientists go about studying the relationship between brain, body, and behavior
2. To learn how to measure eye position and eye movements and why you might want to do this if you care about how the mind works
3. To design and test a hypothesis about how the human uses visual information to accomplish a goal

PROJECT 21

Professor Dawn Wiser (Chemistry)
Johnson Science Building A 301
Ext. 5092; email: wiser@lakeforest.edu

TITLE: ***Development of hands-on experiments to support the curriculum of a new General Education course on the Chemistry of Art*** (2 students)

I am in the early stages of developing a new course on the Chemistry of Art. The course will be offered as a General Education Science course and, in a modified version, as a First Year Studies course. The course will introduce students to basic chemical principles and the scientific method using case studies from studio art and art conservation. The curriculum will explore topics like the chemistry of pigments, the properties of materials commonly used as media (ceramics, metals, fibers), the process of chemical etching, and the analytical methods used to authenticate works of art. As a GEC science course, it will not have a formal laboratory component, but I will use a series of short hands-on experiments to provide experience with the concepts. The student involved in this project will work in the laboratory to develop the procedures and instructions necessary to carry out the hands-on experiments and analyses. The project will also involve conducting a survey of similar courses at other institutions in order to help identify curricular content.

The project will be suitable for students who have completed Chemistry 115 and Chemistry 116, or with AP credit in Chemistry 115 and a good laboratory background. Experience in art is not necessary, but students interested in both chemistry and art will find the project particularly appealing. This project can support 1 or 2 students working together.

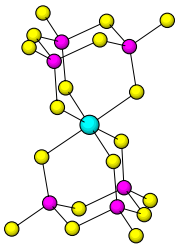
RSCH 182 (OPTION II, TEN-WEEK)

PROJECT 1

Professor Jason Cody (Chemistry)
Johnson Science Building A 305
Ext. 5093; email: cody@lakeforest.edu

TITLE: ***New Instruments for General Chemistry Laboratory*** (1 or 2 students)

Often the first step toward technological solutions for persistent problems is the synthesis of new materials with unpredicted properties. As part of an ongoing collaboration between my research group and colleagues in France and Germany, my students and I have developed a route to new materials in my lab.



The search for new materials will be carried out through reactions in low-melting salts, known as ionic liquids, as solvent. This relatively new area of chemistry has received much attention recently because these solvents don't boil, don't burn, and can substitute for other more hard to handle liquids. Because some of the materials decompose in air, precautions must be taken with these materials to work with them under conditions where oxygen and water are excluded. Thus, we will use special laboratory techniques for handling such air-sensitive materials. Subsequently, we will study the structure of the products using X-ray diffraction. With this technique, we can learn the exact molecular structure. The figure shows a never-before-seen ion, $[NiP_6S_{18}]^{4-}$, that was recently prepared in my laboratory by a former Richter Scholar and published in a top journal. In the past three years, our lab has made four new compounds.

The incoming Richter Scholar will participate in every aspect of this project, working with me to formulate goals and experiments. Careful record keeping, enjoyment from working with one's hands, and imagination are keys to the success of this project. The project will conclude with a written summary of results and suggestions for future experiments. One year of college chemistry is a prerequisite.

PROJECT 2

Professor Shubhik DebBurman (Biology and Neuroscience)
Johnson Science Building A 201
Ext. 6040; email: debburman@lakeforest.edu

Discovering Molecules & Mechanisms to Combat Parkinson's Disease (2 students)
During summer 2013, the DebBurman lab seeks up to two highly motivated hardworking undergraduates to form a collaborative team with a diverse group of three other upperclass peers that study how certain human disease-linked proteins misfold and if such folding errors can be suppressed or reversed. Proteins are the most diverse class of macromolecules in our cells and their unique functions hold the secret to life. To fold correctly, most proteins require chaperones, which are proteins that help other proteins fold into their proper shapes and maintain their shape. If proteins still misfold, they are targeted for destruction by well-known degradation systems. But some misfolded proteins that such escape quality control, build- up in tissues and cause tragic incurable diseases. With the aid of national grants, we have focused on the

protein folding mysteries underlying one such illness, Parkinson Disease (PD), which is caused by the misfolding of the protein, alpha-synuclein. This misfolding somehow selectively kills certain nerve cells that control our voluntary movement, which then lead to PD symptoms.

For RSCH 182 (Independent Research Experience II), Richters will join current student researchers in my lab are who are testing several hypotheses that test what regulates the misfolding of alpha-synuclein in PD. Some students are focused on evaluating specific protein families that include (1) remodeling factors, (2) enzymes of the ubiquitin-proteasome pathway, (3) the lysosomal degradation pathway, (4) the oxidative damage pathway, and (5) the nitrative stress pathway. Other students are creating mutants of alpha-synuclein to evaluate whether specific portions/amino acids within the protein intrinsically control its misfolding and toxicity. To test each hypothesis, students work with two types of yeasts as model systems and they utilize multiple complementary techniques that span molecular genetics, cell biology, and biochemistry.

The Richter students can choose to work with any of the above hypothesis-driven projects, or propose new ones, and will enjoy significant control over experimental aims and design. In addition to carrying out their research project, Richter students will attend a prestigious scientific summer conference in Chicago in mid-June, learn to discuss and present the latest published discoveries through scientific journal clubs, and discuss data at weekly lab meetings. Many past Richters have continued working additional years in these projects, with some expanding them into senior theses, which they often present at national conferences. Over twenty students, including six Richters, have become co-authors in published articles or manuscripts currently in submission and preparation. All lab graduates have gone on to pursue PhD, MD, or other scientific/health professions degrees. Pre-requisite: BIOL120 and CHEM115, and CHEM116.

PROJECT 3

Professor Les Dlabay (Economics & Business)
Young Hall 304
Ext. 5145; email: dlabay@lakeforest.edu

TITLE: ***Youth Financial Services and Enterprise Development: A Regional Comparison***
(1 or 2 students)

Project Overview: With extensive numbers of children facing independence at a very young age due to poverty, war, and AIDS, their economic opportunities are usually very limited. Youth enterprise programs include: (1) workforce development initiatives to develop knowledge, skills, and attitudes for productive work. These activities attempt to bring business, government, and other sectors together in an attempt to provide training to fill the "skills gap" for youth to effectively participate in the world of work. (2) Enterprise development programs guide young entrepreneurs in starting and operating businesses with training, technical assistance, and inclusive market activities. (3) Youth financial service activities provide needed banking programs that include loans, savings, and payment systems for youth markets in Africa and other regions. With developing economies and emerging markets not able to create enough jobs for the large youth population, self-employment becomes an important option.

Student Research Activities/Outcomes: (1) review previous research related to youth enterprises and youth financial services; (2) conduct library and web research to obtain additional information regarding youth financial services in Africa, Asia, and Latin America; (3) create a conceptual framework to identify the key elements of youth financial services and youth enterprise; (4) conduct in-person and e-mail interviews with people familiar with the culture, political situation, and youth situation in Africa, Asia, and Latin America; (4) prepare a summary

report comparing varied models for youth enterprise in varied cultural settings; (5) develop a PowerPoint presentation or video with an overview of varied cultural models for youth financial services and youth enterprise.

Preliminary References

- Policy Opportunities and Constraints to Access Youth Financial Services (www.uncdf.org/sites/default/files/Download/AccesstoYFS.pdf)
- Effective Marketing for Scaling Up Financial Services to Youth (www.youtheconomicopportunities.org/sites/default/files/uploads/resource/YFSEffectiveMarketing.pdf)
- www.makingcents.org; www.youtheconomicopportunities.org; http://store.yefonline.com
- Financial Knowledge and Attitudes of Youth in Ghana (http://csd.wustl.edu/Publications/Documents/RB12-37.pdf)
- 2012 State of the Field in Youth Economic Opportunities: A Guide for Programming, Policymaking, and Partnership Building (www.youtheconomicopportunities.org/state-of-the-field/publication/2012)

Mentoring/Monitoring: Students will be provided with readings related to youth financial services and youth enterprise development as well as research techniques. A series of research questions will be developed to create structure for research activities. Research meetings (and field research visits) will take place two or three times a week. E-mail updates will be required from students to monitor progress and to provide feedback.

PROJECT 4

Professor Les Dlabay (Economics & Business)
Young Hall 304
Ext. 5145; email: dlabay@lakeforest.edu

TITLE: ***Where There Are No Jobs: Facilitating Value Chain Activities and Market Systems at the Base-of-the Pyramid (BoP)*** (1 or 2 students)

Project Overview: Development organizations and microfinance institutions (MFIs) are dedicated to ongoing efforts that create micro-enterprises and enhance market systems to alleviate poverty among people in base-of-the-pyramid (BoP) settings (people living on $2 or less a day). However, the availability of markets for selling goods and services is often lacking. *Value chains* involve the activities needed to move a product or service from innovation to the end-user. *Value chain facilitation for inclusive markets* refers to developing a market system that can improve livelihood opportunities for the poor involved at different levels of the value chain. This process requires linkages among local entrepreneurs, global companies, government, raw material providers, development agencies, and other participants to plan, implement, and finance these complex, dynamic market structures. *Microfranchising* applies a franchising business model in BoP settings to enhance micro-enterprise development. *Microconsignment* is a sustainable business model for delivering health-related and socially beneficial products and services. Several examples in Africa, South Asia, and Latin America provide evidence that a value chain approach offers economic and social benefits to vulnerable populations, including the very poor, women, and youth.

Student Research Activities/Outcomes: (1) review previous research related to value chain facilitation and market system development; (2) conduct library and web research to obtain additional information regarding value chain facilitation; (3) create a framework to relate value chain activities and microfinance services; (4) conduct in-person and e-mail interviews with people familiar with culture, political situation, and value chain activities in BoP settings; (5) prepare a summary report of recommended value chain actions in base-of-the-pyramid market settings; (6) develop a PowerPoint presentation or video overview of value chain actions in base-of-the-pyramid market settings.

Preliminary References

- Where There Are No Jobs by David Befus; www.wheretherearenojobs.com
- *Where There Are No Jobs: The MicroEnterprise Handbook, Vol. 1* by Stephen W. Gibson and Tina J. Huntsman
- *Microfranchise Toolkit: How to Systemize and Replicate* by Jason S. Fairbourne and Stephen W. Gibson
- www.microconsignment.com
- *Value Chain Finance: Beyond Microfinance for Rural Entrepreneurs* (Royal Tropical Institute)
- *Integrating Very Poor Producers Into Value Chains: A Field Guide* (World Vision)
- Value Chain Wikis:
    - http://en.wikipedia.org/wiki/Value_chain
    - http://microlinks.kdid.org/good-practice-center/value-chain-wiki

Mentoring/Monitoring: Students will be provided with readings related to value chain facilitation and market system development as well as research techniques. A series of research questions will be developed to create structure for research activities. Research meetings (and field research visits) will take place two or three times a week. E-mail updates will be required from students to monitor progress and to provide feedback.

PROJECT 5

Professor Karen Kirk (Biology)
Johnson Science Building D 235A
Ext. 6044; email: kirk@lakeforest.edu

TITLE: Telomeres- Mutating genes that affect the tips of chromosomes (1 student)

Many cancer biologists study telomeres, specialized protein-DNA complexes at the tips of chromosomes, as it has been hypothesized that they are crucial to the tumorigenic process. An enzyme called telomerase makes the DNA in the telomeric complexes, and this enzyme is abundantly expressed in cancer cells. In addition to their role in cancer, telomeres may have a role in stress and aging. These roles stem from the finding that telomeres are shorter in cells with limited replication potential (most normal human cells) and longer in those that can divide for numerous generations or indefinitely (germ, stem, or cancer cells). If a cell is going to replicate a great number of times, as in cancer, it needs longer telomeres than a normal cell with limited replication potential. Shortened telomeres and reduced number of divisions may be a normal part of the aging process in humans, and may lead to decreased lifespan in stressed individuals. Conversely, heightened telomerase activity, and the ability to keep telomeres long, may be part of the molecular mechanism needed for cells to turn cancerous.

In my lab, undergraduates and I are working under a National Science Foundation award to study telomeres in microbes. We seek to learn more about telomere function by using a genetic model organism where very little is known, a filamentous fungus called *Aspergillus*. Last summer students identified the

gene encoding an RNA portion of the enzyme telomerase and published their findings in the journal, *PLOS ONE*. No such gene had been identified in any filamentous fungus prior to our work. This upcoming summer (2014) we plan to make mutations in this gene to determine the function of the gene product at the telomeres. We will utilize a test that we call telomere-anchored PCR, a novel approach that was designed by Richter scholars in the past, to address whether a mutation lengthens or shortens the telomeres or whether it changes the DNA sequence. This will indicate the function of the mutated portion of the gene.

Richter Scholars and more advanced students work with me to learn about designing and executing experiments. These students utilize state-of-the-art molecular, cell biology, and genomics techniques, and many ultimately do senior theses and present their findings at national scientific conferences and in co-authored journal articles. Richter candidates for my lab should have completed at least one semester of biology and one year of introductory chemistry by the start of the Richter summer.

PROJECT 6

Professor Desmond Odugu (Education)
Buchanan Hall 222
Ext. 5177; email: odugu@lakeforest.edu

TITLE: ***Language Choice, Historical Literacies and Social Change in Multilingual Africa***
(1-3 students)

Background: Researchers who study the relationship between education and development (especially those in Development Studies) are increasingly aware of the important role of language in education within multilingual societies. However, while many studies document the need for encouraging language diversity in education, we still have very poor empirical understanding of how language relates to many other important factors that shape development. In this research, I have designed projects that will allow us to understand how people's choices of language ("language choice") interact with their understanding of the history of their societies ("historical literacies"). Both are important because they can inform us a lot about how and why people contribute to processes of social change in their society, which facilitates "development". Over the summer 2013, I visited seven countries in Africa to explore new sites for longitudinal projects that examine the multiple ways language choices in education and historical literacies can shape attitudes to social responsibility, especially in countries that experienced European colonialism.

These projects are designed fundamentally as community projects, with the first phase intended to last at least 10 years. This is partly because the majority of current donor-driven short-term projects often produce less than desirable results (and much frustration) in participating communities due to poor infrastructures for local ownership of the projects. This research introduces a new model of community partnership by (a) injecting project ideas into communities that exhibit characteristics relevant to this research interest, (b) providing basic operational support, and (c) documenting the evolution of these projects and the relevant variables (language choice, historical literacies and social change).

Current Status and Richter Scholars' Responsibilities: During my summer research travels, I set up communities of partners in all seven countries (South Africa, Botswana, Kenya, Tanzania, Uganda, Ghana and Nigeria), comprised of expert researchers and professors at major universities in the respective countries. We have also developed instruments for collecting data in elementary and high schools. This study now seeks two (2) enthusiastic Richter scholars interested in development in non-Western contexts. The scholars will work with the faculty mentor and principal investigator (PI) to:

1. Review and revise the data collection instruments developed for this project. These instruments are designed for collecting qualitative and quantitative data on

    a. undocumented historical traditions in local languages
    b. oral traditional folklores in local languages
    c. individual-level educational outcomes and specified public activities (including political, economic and cultural activities).
2. Pilot the instruments with a team of experts in the seven countries listed above.
3. Develop and update web-based databases (including website) for managing and hosting the data.

Richter scholars do not need to have expertise in any of these areas. No language skill is required other than English. They will be provided the basic training needed to accomplish all assigned tasks. By participating in this project, the Richter scholars will

1. learn the fundamentals of designing longitudinal cross-cultural comparative studies in the social sciences,
2. acquire basic skills in web design and programming (including some basics on computer programming languages, such as HTML and CSS),
3. develop some skills for analyzing qualitative and quantitative data (using statistical packages, such as SPSS), and
4. gain experience working with an interdisciplinary team of experts across several countries.

The scholars will have future opportunities for paid work as research assistants on these projects. By successfully completing all assigned tasks, the scholars will be able to demonstrate (and earn credits for) their new skills in the research design materials and websites/databases they worked on.

This project calls for two Richter scholars to meet the design demands and breadth of the projects, which ranges from conceptual issues to technical and organizational skills. The scholars' success will depend largely on the collaborative structure of their work for two reasons. First, to understand the conceptual issues relevant to this study, there needs to be shared tasks in familiarizing students with research literature in the fields of language and of history. As such, I would like each student to work only in a one field of research, and to jigsaw their understanding through guided discussion sessions. Second, during the pilot phase of this program, I anticipate significant communications from project partners across the seven countries. The volume of data and communication will be potentially overwhelming to one scholar, especially if he/she has to rely on newly acquired basic skills in database management. Moreover, my experience from previous Richter Scholar program suggest that students are more motivated and productive when they work collaboratively than when they work singularly with the Richter mentor.

PROJECT 7

Professor Davis Schneiderman
Carnegie Hall 202
Ext. 5282; email: dschneid@lakeforest.edu

TITLE: Marketing and Publicity for Lake Forest College Press/ &NOW Books (1-2 students)

This project looks for a student interested in working to publicize and further a number of interrelated projects: 1) forthcoming Lake Forest College Press / &NOW Books publications, including *Terminal Town* (a history of Chicago's transportation terminals); the fifth book in our Plonsker Prize series, *Titanic* (release October 2014); *The Light in Cuban Eyes* (a gallery collection of photos from Cuba); and the third volume of *The &NOW AWARDS: The Best Innovative Writing* (2015), along with 2) the general web presence of Lake Forest College Press / &NOW Books.

The interested student/s may intersect with these projects in an almost limitless number of ways, subject to the particular interest of the Richter. This project allows students to become co-inquirers as we investigate the best ways for our College press to interface with contemporary literature and publishing. This project requires students who can think creatively, and those who wish to develop hands-on perspective about an industry that may be quickly slipping toward the obsolescence of its main delivery mechanism: the book. Put another way, no one has really figured out how to publish in a world where the printed book is breathing its last. Together, let us see if we can figure it out. Lake Forest College Press / &NOW Books are distributed by Northwestern University Press.

PROJECT 8

Professor Davis Schneiderman
Carnegie Hall 202
Ext. 5282; email: dschneid@lakeforest.edu

TITLE: ***Lake Forest in the Age of Gatsby: A Social, Economic, and Architectural Study*** (1-2 students)

The Norman/French Chateau at 111 West Westminster in Lake Forest, adjacent to the downtown area, is considered by many to be one of the most-beautiful houses on the North Shore. A National Landmark, the house was built 1920s, and may have been referenced in F. Scott Fitzgerald's *The Great Gatsby*.

This research project, supervised by Professor Schneiderman, will allow the student to work in close consultation with the property owner, Lake Forest College Trustee Liam Connell, who is the primary researcher. The Richter student will assisted in cataloging and collating existing research on the history of the building and its founding family, work toward digitization of archival issues of the *Lake Forester* (for use in this project and as a community public service), and engage in additional historical research of primary and secondary documents, include news archives, to facilitate further developments of the project.

This project will best serve students who can think creatively, and those who wish to explore the interlaced aspects of local history, politics, economics, and settlement, as interfaced with the larger story of the Chicago region.

PROJECT 9

Professor Alexander Shingleton (Biology and Neurosciences)
Johnson Science Building A 209
Ext. 6049; email: shingleton@lakeforest.edu

TITLE: ***Keeping things in proportion: The (juvenile) hormonal regulation of relative organ size (2 students)***

The shape of an organism is defined by the size of its individual body parts relative to each other and to the body as a whole. Because of the tight link between organismal form and function, the developmental regulation of body proportion is fundamental to generating a fully functioning adult. In order to generate a correctly proportioned adult, growth of individual organs and tissues must be coordinated across the body as a whole. This growth coordination is presumably hormonally regulated, and yet we have a very poor understanding of what these hormones are and how they work. Recent research in our laboratory has identified a novel regulator of body

proportion in insects: *juvenile hormone* (JH). This hormone has historically been considered responsible for controlling the transition between the different stages in an insect's life-cycle (larval, pupal, adult). However, we have discovered that changes in JH levels during development also influence adult body-proportions. Our next task is to elucidate how this hormone is acting at a physiological level to influence adult body form.

This is an Option II Richter project suited to students with an interest in physiology and the biomedical sciences. We have generated the transgenic flies necessary to conduct our experiments, but these flies have to be crossed with each other to experimentally manipulate JH levels during the development of their progeny. Further, these progeny need to be dissected and measured during and after their development to assay the effects of JH on the growth of their individual organs.

The research is well suited to students at the beginning of their research careers and will equip them with the skills necessary to continue research in biology in general, and *Drosophila* developmental physiology in particular. Specific skills acquired will include: a working understanding of Mendelian genetics; dissection, microscopy, and image analysis; as well as basic methods in molecular biology. This is an open-ended project, but great progress can be made within a ten-week time frame. Participation does not require specific biological knowledge. However, in order to understand the rationale behind the research, students must have complete BIOL120 and a biological inquiry course before joining the lab. The project requires two students who will work together to complete the research. Grades will reflect student commitment to the project, both with respect to data collection and intellectual engagement.

PROJECT 10

Professor Enrique Trevino (Mathematics)
Young Hall 105
Ext. 6187; email: trevino@lakeforest.edu

TITLE: ***Quadratic non-residues and multiplicative functions*** (2 students)

My main research area is analytic number theory and in particular questions regarding the distribution of quadratic non-residues modulo a prime. Last summer working with a couple of undergraduates at Swarthmore College we were able to answer some questions I had about quadratic non-residues and in that work new questions came up. I would like to work with students at creating data about quadratic non-residues to see if we can provide evidence for the patterns we predict.

This project requires more knowledge before one can start getting new results, which is why I suggest this as a ten-week program. In those ten weeks I would teach students basic number theory, would have them work on discovering some of the basic number theory results on their own and then challenge them to write simple computer programs that can evaluate the functions they are learning. After having them run these programs, I would teach them new results and ask them if they can incorporate that into their programs. By the middle of the project, I expect the two students to have really good computational number theory algorithms. The second half of the project would be dedicated to exploring the unknown questions regarding quadratic non-residues with the algorithms they created to analyze number theoretic functions.

If the students go through the program faster than I expect, then we can attack a question regarding multiplicative functions. There is a class of multiplicative functions that haven't been well studied since the 1970s. The techniques to study them are recent (my PhD dissertation is the

main tool to study them) and there are many questions I could throw at students regarding these functions that could be answered by a students with the proper computational number theory skills.

PROJECT 11

Professor Dawn Wiser (Chemistry)
Johnson Science Building A 301
Ext. 5092; email: wiser@lakeforest.edu

TITLE: ***Computational modeling of the structure and energies of transition metal zirconium complexes*** (1 student)

My research uses computer modeling to understand how the structure of a transition metal containing catalyst can affect the outcome of a catalytic reaction. The reactions I study are important to the *pharmaceutical* and *petrochemical* industries.
The goal of this research project is to understand how to optimize the synthesis of zirconium containing catalysts called metallocenes in order to increase their availability for use in the manufacture of specialty polymers and in pharmaceutical research. The project involves exploring the structural and energetic properties of a series of known catalysts that exist in more than one structural form. We will use the computer to determine which structural form is most favorable and attempt to identify the reasons for the added stability. The results will be used to predict appropriate targets for synthesis by my collaborator at the University of Chicago.

A Richter scholar participating in this project will be directed and closely supervised by me, and will work closely with my upper level research students to gain valuable experience with computer modeling software. The student will perform molecular modeling calculations using Spartan and Gaussian software packages. The student will gain valuable experience in understanding chemical structure and the relationship between molecular structure and the relative energy of these structures. The project is suitable for 1 student and will be most interesting to students interested in the intersection of chemistry, computers, mathematics, and/or physics. Necessary prerequisite materials include Chemistry 115/116 and a willingness to use Mac, PC, and LINUX computers. As with all research, there will also be a significant amount of literature research.

The criteria for awarding grades will include an assessment of ability to practice the scientific method using the methods available in our labs and library as well as appropriate documentation of results and project status.

PROJECT 12

Professor Ben Zeller (Religion)
Buchanan Hall 005
Ext. 5175; email: zeller@lakeforest.edu

TITLE: Creating a Religion & Food Bibliographic Database (1 student)

The study of the relationship between religion & food is an emerging new area of research among scholars of religion, and I have been part of an academic group working to expand studies in this area. As part of my work, I want to develop a bibliographic database of academic works (books, articles, theses) that in some way involve religion & food. The database will be annotated, meaning a few sentences about each entry, as well as having keywords to help with searching. I

also want to make it public and accessible online, since I want to share it with my colleagues in many different colleges and universities across the world.

I am looking for a student with a mix of the following abilities: good reading skills, computer fluency, willingness to work in a self-directed manner, and interest in the topic or humanities scholarship more broadly. I will teach you how to find resources and how to annotate them, and we will work together to investigate different database solutions to store and publish the bibliographic material. Students with interests in the "digital humanities"—blending traditional humanities scholarships with the use of computers—should find this work interesting. Grading and assessment will be based on our successful creation of this bibliographic database.