

# CAROLINA context

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## FERREL GUILLORY

*Director*  
*guillory@unc.edu*

## THAD BEYLE

*Senior Research Fellow*  
*beyle@email.unc.edu*

## HODDING CARTER, III

*Leadership Fellow*  
*hoddincarter@unc.edu*

## D. LEROY TOWNS

*Research Fellow*  
*dltowns@email.unc.edu*

## THE PROGRAM ON PUBLIC LIFE

is a non-partisan organization devoted to serving the people of North Carolina and the South by informing the public agenda and nurturing leadership. The Program on Public Life is part of the School of Journalism and Mass Communication at the University of North Carolina at Chapel Hill.

## DIRECTOR'S NOTE

This issue of Carolina Context comes in the form of two interrelated essays, exploring the potential and the challenges facing North Carolina as it seeks to advance in the energy and green-economy sectors. These essays draw on the "dealmaker" framework developed by Ted Zoller, associate professor of strategy and entrepreneurship and director of the Center for Entrepreneurial Studies at UNC's Kenan-Flagler Business School.

In the energy-focused essay, Zoller's colleague Frank Ethridge develops an analysis based on their access to a private data base held by Standard & Poor's Financial Services.

Ethridge collaborates with Zoller on numerous consulting projects and has worked as a research analyst at the Frank Hawkins Kenan Institute of Private Enterprise under the supervision of Executive Director Raymond Farrow.

Using the data base, Ethridge was able to identify and assess actors in the energy sector according to geographical location, their affiliations with entrepreneurial firms and the universities that awarded them bachelor's and master's degrees. He and Zoller conclude that North Carolina's rural areas have the potential to serve as sites for manufacturing and construction in green-energy enterprises, while the entrepreneurs are likely to cluster in metro areas.

In his essay, Zoller argues that efforts to increase the presence of dealmakers in North Carolina would give the state added potency in energizing its economy. Zoller's analysis confronts the view "that all entrepreneurs and investors are created equal." Rather, he writes, dealmakers, who have multiple connections, take on a special catalytic role in the social networks that lead to the creation of new firms.

Zoller's research has led to the creation of the Blackstone Entrepreneurs Network, which will work in the Research Triangle region to turn innovative ideas into successful companies.

Meanwhile, Zoller has taken on an additional role as vice president for entrepreneurship at the Ewing Marion Kauffman Foundation, the Kansas City-based national philanthropy with a specific focus on entrepreneurship. Zoller will continue to teach at UNC-Chapel Hill.

The Zoller and Ethridge essays come as Governor Bev Perdue and other policymakers have sought to position North Carolina in the emerging green economy. In addition, a scientific advisory panel, appointed by the governor, will soon make recommendations on off-shore energy options.

What's more, President Obama recently visited the Research Triangle Park along with members of the national Jobs and Competitiveness Council, chaired by General Electric CEO Jeffrey Immelt. At that time, the council held a panel discussion on smart grid innovations at N.C. State University's Centennial Campus. To address the nation's unemployment challenge, the council also issued recommendations, including graduating more engineers and bolstering the completion rates of community colleges. Data and analysis on North Carolina's need for more of its citizens to earn degrees and job-qualifying credentials to meet projected labor-market demands for higher skills were presented in the January 2011 issue of Carolina Context.

In publishing these essays, the UNC Program on Public Life expresses appreciation for the collaboration of the Kenan-Flagler Business School and its Frank Hawkins Kenan Institute of Private Enterprise. In the recent past, we collaborated in organizing roundtables on North Carolina economic development and in bringing together journalists who write on economic and business issues with UNC faculty.

— FERREL GUILLORY

*Director, Program on Public Life*

## 'Hard green' jobs in the energy sector

FRANK ETHRIDGE

In North Carolina as elsewhere, policymakers have exhibited an increased interest in promoting environmentally friendly employment — often termed “green jobs.” Still some debate arises over exactly how to define a green job.

Recently, the Bureau of Labor Statistics (BLS) offered a definition: “The green economy encompasses the economic activity related to reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy usage, recycling materials, and developing and adopting renewable sources of energy.”

The BLS listed 12 primary sectors in which it expected green jobs to emerge: research design and consulting, manufacturing, renewable energy generation, green construction, environmental protection, transportation, government and regulatory administration, energy efficiency, agriculture and forestry, recycling and waste reduction, energy trading, and energy carbon capture.

And yet, the BLS definition leaves some ambiguities. Its definition clearly encompasses someone who runs a recycling or solar energy business, but would it extend to someone working on smart-grid technology or on installing insulation in an older home? A further ambiguity arises in categorizing employees who spend only a portion of their working hours devoted to tasks centered on environmental improvement.

The analysis that follows adopts a narrower, more focused definition that avoids some of the ambiguities in the BLS definition and in the debates as they play out in the media. This analysis focuses on a much narrower set of industries and more closely on jobs that could be called “hard green.”

So, this is a look at jobs clearly oriented toward the energy sector, including traditional energy companies, renewable energy companies, and energy services. The data for this analysis are drawn from Capital IQ, a private database maintained and licensed by Standard & Poors that provides quantitative research and analysis applications to more than 4,200 investment management firms, private equity funds, investment banks, advisory firms, corporations and universities.

The proprietary database was scanned for companies in the following industry sectors:

### Renewable Energy Generation

Electric Power by Wind Energy  
Photovoltaic  
Biofuels  
Electric Power by Solar Energy  
Fuel Cells  
Alternative Fuels

### Traditional Energy Generation

Hydroelectric Power Generation  
Electric Power Generation  
by Fossil Fuels  
Electric Power Generation  
by Nuclear Fuels

### Energy Services

Energy Equipment and Services  
Oil, Gas, and Consumable Fuels

To gain insight into what is going on in the energy sector, the dealmaker framework recently developed by Ted Zoller, Director of the Center for Entrepreneurial Studies at UNC’s Kenan Institute, was used to analyze the networks of people within the energy industries. This process involves running an algorithm that identifies individual actors based on their entrepreneurial firm affiliations, their geographic locations, and their parallel affiliations as executives or board members of finance firms within the United States.

*NORTH CAROLINA could be well positioned to move into A HIGHER POSITION among states that are ENERGY-RELATED DEALMAKERS.*

The dealmaker framework involves separating actors into groups based on the number of concurrent firm ties they hold, allowing for comparison between typical entrepreneurs and investors and those with multiple entrepreneurial firm ties. People with three or more concurrent company ties are dubbed a “dealmaker” in this framework. Much of the theory underlying this framework is based on the idea that dealmakers play a crucial role in networks and combine attributes of both entrepreneurs and investors. The expectation is that dealmakers will be more activist and deterministic within an organization as they may be able to use outside relationships to shape an organization’s direction.

A scan of energy industries produced the following list of states ranked in order of energy-related dealmakers:

State	Count	State	Count
1 Texas	254	7 New York	16
2 California	57	8 Ohio	12
3 Oklahoma	43	9 Pennsylvania	12
4 Colorado	41	10 Washington	12
5 Louisiana	21	28 North Carolina	6
6 Florida	16		

Even a cursory look at this ranking suggests the not-surprising finding that states already heavily invested in energy industries have the most energy-related dealmakers. A further look points to a “three-tiered” distribution, with the mega-state of Texas clearly in the lead, California, Oklahoma and Colorado grouped in the middle, and a variety of states in several U.S. regions in the third grouping

North Carolina’s position in this list leads to the conclusion that the state would face real difficulties in catching Texas and California. And yet, North Carolina could be well positioned to move up to the top of the second tier.

**COMPANIES WITHIN NORTH CAROLINA**

The database provides an assessment of the distribution of energy firms throughout North Carolina. Here is a list of companies by metropolitan regions:

Charlotte Area	37	Asheville Area	16
Raleigh Area	28	Rocky Mount Area	16
Greensboro Area	24	Hickory Area	10
Fayetteville Area	18	Kinston Area	6

These numbers do not always reflect where all of the companies branch offices are located. Nevertheless, this chart tends to suggest that the I-85/I-40 corridor is where the vast majority of these companies are based. In aggregate, these companies employ roughly 50,000 people.

Here are some sample firms in each of the three main sectors:

**ADDITIONAL INSIGHT** *into entrepreneurs working in the ENERGY SPACE comes from looking at the network of entrepreneurs in a dense region.*

Clearly, firms in the renewable energy sector are younger than in the other two sectors.

**KEY UNIVERSITY AFFILIATIONS**

The Capital IQ database also permitted a scan for the university affiliations of the employees associated with the firms in the three major industry categories. University connections are crucial as a source of social capital. The numbers of persons trained in universities and positioned in these advanced technology sectors serve as a reasonable proxy for important sources of innovation in an advanced economy.

For each of the sectors, this scan computed an aggregate list of all degrees, undergraduate, master’s, PhD, law, medical, or other professional.

Among North Carolina-based universities, only Duke University showed up in the top 10 in the lists produced by this scan. It ranked 10th overall in universities with key actors in traditional energy, and its ranking had much



**ENERGY SERVICES**

Company	Headquarters Location	Year Founded (if available)
Progress Fuels Corporation	Raleigh Area	1976
Quality Oil Company , LLC	Greensboro Area	1929
TECO Coal Corporation	Charlotte Area	1995
Acme Services, Inc.	Charlotte Area	1935
Eagle Transport Corporation	Rocky Mount Area	1969



**TRADITIONAL FUEL**

Company	Headquarters Location	Year Founded (if available)
Duke Energy Corporation	Charlotte Area	1916
Progress Energy Inc.	Raleigh Area	1908
Carolina Power & Light Company	Raleigh Area	-
Primary Energy of North Carolina LLC	Charlotte Area	-
Black River Energy, LLC	Charlotte Area	1987



**RENEWABLE ENERGY**

Company	Headquarters Location	Year Founded (if available)
Extend Energy, LLC	Greensboro Area	2008
FLS Energy, Inc.	Asheville Area	2006
Maverick Biofuels, Inc.	Raleigh Area	2008
MegaWatt Solar, Inc.	Greensboro Area	2006
Rollcast Energy, Inc.	Charlotte Area	2005
Sencera International Corporation	Charlotte Area	2003

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to do with its master's degree graduates. Indeed, the lists of master's degree-holders in the energy sector tended to spotlight universities with strong business programs, and the fact that many executives in upper management have MBA degrees. Similarly, the bachelor's degree list tended to skew more toward universities with strong engineering schools.

Not surprisingly, the University of Texas at Austin and Texas A&M University rank high on the traditional fuels-sector list, likely due to the focus on the petroleum industry in Texas. Leading engineering schools such as MIT, Stanford, and Georgia Tech also rank high. One could conclude from this scan that undergraduate training in a technical scientific or engineering-oriented undergraduate curriculum, followed by formal business training, positions a person for a "hard green" job in energy sector firms.

### EXPANDING THE DEALMAKER FRAMEWORK

Additional insight into entrepreneurs working in the energy space comes from looking at the network of entrepreneurs in a dense region. An obvious connection to investigate is the link between actors working for renewable

energy firms and their counterparts in traditional energy firms.

The Capital IQ database was scanned for firms in more than thirteen "technopole" regions — specifically the technology-rich metropolitan areas of Boston, Silicon Valley, Phoenix, Seattle, Minneapolis, Denver, Orange County (CA), San Diego, Portland, Salt Lake City, Raleigh, Austin, and Houston. This choice of locales was determined through surveying existing literature on entrepreneurship and identifying the regions that were most frequently studied.

In addition to scanning over the industry segments outlined above, the database was also scanned for Telecommunication Services, Healthcare Equipment and Supplies, Health Care Technology and Pharmaceuticals, and Biotechnology and Life Sciences. The data were then aggregated to identify entrepreneurs in those 13 regions and focus on those connected with an energy company.

From such a scan came the following chart, listing entrepreneurs into six categories. The industry connections of the actors in these categories are listed here:

	Some Affiliation with Energy Services	Some Affiliation with Renewable Energy	Some Affiliation with Traditional Fuels	Affiliated with Energy Services but not Traditional Fuels or Renewable Energy	Affiliated with Renewable Energy but not Energy Services or Traditional Fuels	Affiliated Traditional Fuels but not Energy Services or Renewable Energy
Oil, Gas and Consumable Fuels	3543	8	8	3528	0	0
Energy Equipment and Services	327	1	1	325	0	0
Alternative Fuels	0	5	0	0	5	0
Biofuels	4	45	0	0	41	0
Electric Power by Solar Energy	1	217	71	0	145	0
Electric Power by Wind Energy	2	349	187	0	161	0
Fuel Cells	0	57	0	0	57	0
Photovoltaic Cells	1	147	0	0	146	0
Electric Power Generation by Fossil Fuels	7	191	430	0	0	233
Electric Power Generation by Nuclear Fuels	4	55	126	0	0	67
Hydroelectric Power Generation	6	142	278	0	0	131
Health Care Technology	8	2	1	8	2	1
Healthcare Equipment and Supplies	17	5	4	17	4	3
Pharmaceuticals, Biotechnology and Life Sciences	78	14	7	76	10	5
Information Technology	228	238	51	218	219	40
Telecommunication Services	18	4	0	18	4	0

**From this data, several observations can be made:**

- ctors affiliated with both renewable energy and traditional fuel affiliations have almost all of their renewable energy affiliation in either solar or wind energy. There is very little overlap between people working for traditional fuel companies and those working for companies in the alternative fuel, biofuel and fuel-cell industries.
- Leaders affiliated with renewable energy firms are much more likely to have a connection with IT sectors than with counterparts at traditional energy firms. While there may be a lack of serial entrepreneurs working in the traditional energy space, the chart does suggest a propensity of some IT based entrepreneurs to move into the growing renewable energy space.
- When considering this situation from a policy perspective, a conclusion could be drawn that locales with a strong cluster of IT entrepreneurs would be well positioned to grow in the renewable sector.



**PROS AND CONS: ENVIRONMENTAL POLICY AND SMART GROWTH**

There is debate among economists and policymakers about what role government should play in energy policy and in efforts to promote green technologies. This debate often centers on arbitrating between competing groups, some focusing on environmental impact and others focusing on economic competitiveness.

Some have argued that industries can “make money while doing good” and that environmentally healthy corporate goals and initiatives will in turn be profitable. On the other hand, laissez-faire economists argue that if these industries are truly profitable, government subsidies and incentives would prove unnecessary. Some studies have argued that government investments to promote the green economy merely have a “crowding-out” effect and end up allocating capital less efficiently than it would be distributed by the private sector.

Green initiatives could lead to marginal increases in the price of energy needed for home utilities, which could have a disproportionately negative effect on poorer communities that allocate a higher proportion of income to energy. Still others have argued that rural areas may sometimes be particularly well positioned for growing manufacturing jobs around new renewable technologies and that benefits to rural communities may more than offset additional energy costs. Job opportunities arise in economically distressed communities that focus on basic energy efficiency measures such

as weatherizing or adding additional insulation to older buildings.

Other issues arise in determining the optimum portfolio of green technologies to invest in. There is the question of which energy technologies will be the most efficient in the future as well as the issue of weighing tradeoffs between installing new technologies today and investing in research geared at developing more advanced technologies. State policymakers should weigh whether additional basic research is a more efficient use of today’s resources than implementing a nascent and potentially inefficient technology on a large scale.

Many studies that assess the environmental impact and costs of renewable energy must rely on efficiency projections five to ten years into the future. Some researchers have noted that improving energy efficiency may initially overstate the benefits as a lowered cost of energy may lead to greater consumer use — a phenomenon they dubbed the “paradox of efficiency.”

**POTENTIAL FOR NORTH CAROLINA**

Our view on the overall policy debate is somewhat mixed. We believe that there is clear potential for growth in business sectors focused on energy conservation and on developing technologies that allow for producing energy in a more environmentally friendly way. We also believe that sometimes policy makers and clean energy advocates do not fully account for either the true opportunity costs and technical challenges associated with implementing new energy efficiency technologies or the ancillary benefits associated with cleaner locally generated energy.

Decisions must constantly be made about which technology segments to invest in and develop, and political considerations may sometimes cloud this process.

Further, we are also concerned that the benefits and costs of green initiatives may have widely disparate impacts on different income groups and geographic areas throughout North Carolina. A marginal increase in energy prices is likely to impact poor communities. Moreover, many environmental consulting jobs are concentrated in more highly populated, affluent areas. In North Carolina, the majority of these jobs were concentrated in either the Charlotte or Research Triangle metropolitan areas.

Policymakers should be wary of unintended consequences of certain green initiatives and should recognize that most of the entrepreneurs within North Carolina launching and starting renewable energy companies are likely to reside in the state’s major population centers. Poorer areas of the state may be better positioned to grow in manufacturing or construction jobs that focus on renewable technologies. We also believe that policymakers need to consider fully the impact that green policies have on North Carolina’s economic competitiveness relative to other states.

Findings from the dealmaker analysis indicate that having a strong community of IT-based entrepreneurs and a strong engineering and research university are essential to growing a cluster of green entrepreneurs. We believe that there is a cluster effect with green technologies and other industries, but that this effect may not be strictly linked with traditional fuel and energy service industries.

**There may be benefits in linking IT entrepreneurs with groups interested in funding green initiatives. There could be benefits to setting up forums and networking events to connect these various groups together. University technology transfer offices could play a key role in linking academic researchers with industry.**

Most of the crossover between the traditional fuel and renewable energy spaces is in the solar and wind sectors — which suggests that utilities experiment in the renewable energy space as a first step. But to develop these renewable industries, outside capital and entrepreneurs may be required.

# Expanding 'dealmakers' in North Carolina

TED ZOLLER

Serial entrepreneurs and investors play a special role in motivating the establishment of a vibrant entrepreneurial economy. For an economy to achieve sustained success in generating new enterprises, it must possess a vital network of dealmakers.

Dealmakers leverage their experience and ties to multiple firms to build bridges among actors in the social capital field. They enhance the quality of interconnections among the entrepreneurs and investors active in a network.

For North Carolina, therefore, extending and expanding dealmakers could offer a way to energize a critical catalyst in state and regional economies. The concept of the dealmaker reframes the debate among policymakers and researchers about how to establish a successful entrepreneurial economy.

While the latest thinking is largely dominated by a two-dimensional definition of social capital, oscillating between alternative viewpoints that attribute success to the entrepreneur or the investor, dealmakers combine both of these functions and add a vital third dimension. While current aggregate social capital theory places entrepreneurs and investors in a neat and tight x-y axis, the dealmaker offers a functionality that operates on the z axis.

This analysis calls into question the assertion in current theory that all entrepreneurs and investors are created equal. Indeed, the following chart shows the variation in the distribution of actors with one or two equity positions with entrepreneurial firms and dealmakers with three, four or more concurrent ties. Actors with one or two concurrent entrepreneurial-firm ties

compose 97.3 percent of the average regional sample, while 1.6 percent have three concurrent firm ties, and the remaining 1.1 percent have four or more. Dealmaker entrepreneurs and investors with three or more ties, therefore, consist of the top 2.7 percent of entrepreneurs and investors in the average sample region. While these actors are far less common, they perhaps may represent the *vital few* and serve a quite important role in the founding of new firms. There is substantial variation in this distribution by region, with higher percentages of dealmakers generally associated with the regions most successful in generating new firms.

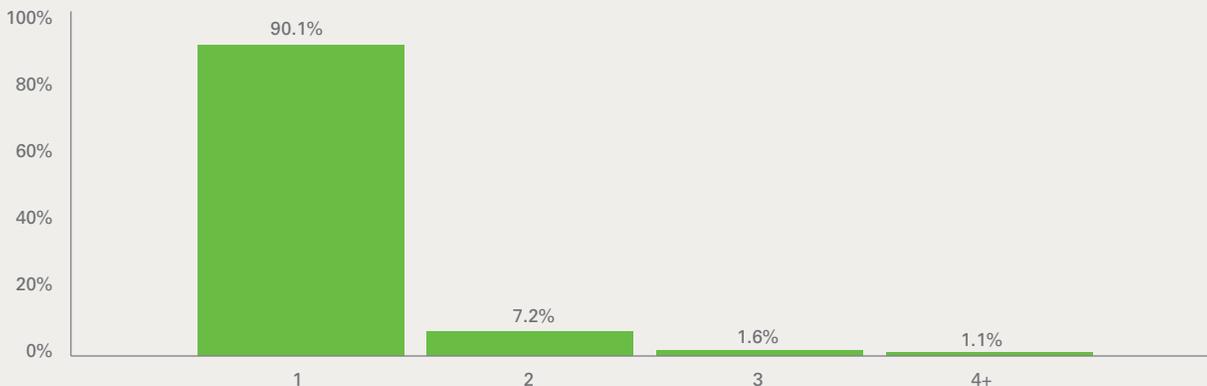
As an alternative to analysis based on counting entrepreneurs and investors in the aggregate, the insight provided by these data is that those regions with the highest percentages of singular-connected actors and relatively smaller percentages of serial-connected actors have not had sustained success in establishing new firms. Singular-connected actors represent the typical profile for rank-and-file entrepreneurs or investors in a given entrepreneurial economy. And surely the *supply* of single-tie actors will likely influence the frequency of firm foundings. Indeed, it is *36 times* more likely on average that an entrepreneur will have one or two concurrent firm ties rather than three or more in the sample regions.

The argument here does not take issue directly with the proposition that a successful entrepreneurial economy results from dense and vibrant aggregate networks of entrepreneurs and investors. Indeed, the findings of this

## DISTRIBUTION OF MEAN TOTAL ENTREPRENEURIAL TIES PER PERSON

	Bay Area	Boston	Seattle	San Diego	Salt Lake City	RTP	Portland	Phoenix	Orange	Minneapolis	Denver	Austin
1	86.07%	89.44%	92.20%	91.39%	93.94%	93.85%	95.56%	95.93%	95.87%	93.11%	94.78%	92.99%
2	9.44%	7.68%	6.13%	6.62%	5.13%	5.28%	3.80%	3.41%	3.76%	5.58%	4.31%	5.83%
3	2.45%	1.71%	1.00%	1.36%	0.62%	0.60%	0.35%	0.50%	0.31%	0.96%	0.50%	0.70%
4+	2.04%	1.17%	0.67%	0.64%	0.31%	0.28%	0.30%	0.15%	0.05%	0.36%	0.41%	0.48%

## TOTAL FREQUENCIES OF MEAN ENTREPRENEURIAL FIRM TIES IN 12 SAMPLE REGIONS





analysis are consistent with and serve to confirm that regions generating high rates of firm births are associated with the presence of viable and dense entrepreneurial social capital.

Without drawing causal inferences, both the empirical and social network analyses suggest that, while an interconnected network of entrepreneurs and investors may be a necessary condition for the establishment of a successful entrepreneurial economy, it is not sufficient. The analysis suggests the following:

1. Structured dealmaker networks do better in stimulating births of new firms than an aggregate network of entrepreneurs and investors
2. A state or region with relatively better success in establishing new firms are generally better endowed with dealmakers, and the most successful places have more dealmakers per average firm birth than less successful places.
3. Successful states or regions have both a higher aggregate density of entrepreneurs and investors but similarly have an even higher proportion of dealmakers per firm.
4. Successful places with cohesive dealmaker networks are associated with success in establishing new firms, and regions with dense and cohesive dealmaker networks are even more highly associated with high rates of new firm births.
5. Places with relatively weaker and less dense aggregate networks of entrepreneurs and investors may be able to overcome this deficit with a more cohesive network of dealmakers.

Conventional wisdom perhaps overemphasizes the role of entrepreneurs and investors in the aggregate in establishing an entrepreneurial economy. The existence of dealmakers may in fact be a better predictor of the establishment of a successful entrepreneurial economy than traditional measures of aggregate social capital. There may exist a critical symbiosis between individual entrepreneurs and investors and the dealmakers who may build bridges among them.

State and regional policy should, therefore, seek not only to focus on and support dealmakers, but also be informed by their experience and distinctive role in the economy. Future examinations of policy should look beyond rank-and-file entrepreneurs and investors and should instead place particular attention on dealmakers. Dealmakers may help both *inform* effective public policy and represent an efficient network through which policy change may be *implemented*.

Dealmakers influence multiple firms. Therefore, public policies may be designed to work in parallel with dealmakers — to facilitate their work and facilitate policy through their work — and thereby encourage the formation of new entrepreneurial ventures. Moreover, once new policy is adopted, this same set of actors may be used to communicate and facilitate policy changes, representing a *virtuous circle* that supports the establishment of an entrepreneurial economy.



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*of* NORTH CAROLINA  
at CHAPEL HILL

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**PROGRAM ON PUBLIC LIFE**

*Campus Box 3365  
Chapel Hill, NC, 27599-9127  
southnow@unc.edu*

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