

**THE ORGANIZATION OF EXPERT ACTIVISM:
SHADOW MOBILIZATION IN TWO SOCIAL MOVEMENTS**

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Abstract

As scientific research is increasingly important to many social movements, the organization of expert activism has become an issue of strategic and tactical concern for movement organizers and of theoretical significance for social movement scholars. Yet the relative invisibility of expert activists within social movements makes them difficult to systematically identify and study. This paper advances understanding of expert activism in four ways: we (1) situate expert activism as a problem of “fractal knowledge politics” that we believe is becoming more pronounced in an era of epistemic modernization; (2) develop the concept of “shadow mobilization” as a form of meso-level interpenetration of science and social movements; (3) present a methodological approach for collecting systematic data on members of this “hard to reach” expert population; and (4) illustrate the theory and the method with a comparative analysis of expert activists (N=178) in the Louisiana environmental justice movement (LEJM) and the Washington alternative agriculture movement (WAAM). Findings from comparative analysis suggest that expert engagement in these movements is highly varied in ways that challenge standard notions of activism, the nature of protest, and the power relations between academic, government, and extra-professional science.

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The interactions of social movement activists and scientific experts have broad consequences for how politics are conducted and rendered meaningful (Hess, Breyman, Campbell and Marin 2008; Ottinger and Cohen 2011; Welsh and Wynne 2013). In studying these interactions, researchers have focused considerable attention on “expert activists” (Allen 2003). Charting their activities and impacts across a range of movements, disciplines, and policy arenas a growing number of studies suggest that expert activism is not a rare type of extra-professional behavior, but one that seems to be increasingly prevalent within different social movements (e.g. Buttel 2005; Delborne 2008; Epstein 1996; Kinchy 2010; Lubitow 2013; McCormick 2009; Waidzunas 2013). Extant studies also show that expert activism can encompass a diverse range of meanings and behaviors many of which may not appear overtly contentious in the sense traditionally described by social movement theory (Bliss 2012, 2014; Brown 2007; Frickel 2006; Moore 2008). Still other studies suggest that expert activists take real risks and can suffer significant costs to their professional, civic, and family lives (Cable, Mix and Hastings 2005; Corburn 2005). For these and other (often more ideological and structural) reasons, expert activists are often not easy to find. This may be because such experts do not self-consciously identify their work with social movements as “activism” per se, or because they remain out of the spotlight of social protest intentionally, choosing instead to work with movements behind the scenes and thus minimize risk to their careers. Either way, this relative invisibility can make expert activists difficult to identify systematically in ways that forestall a more comprehensive understanding of the mechanisms of interpenetration of science and social movements. We need a better way to find and study expert activists across a range of disciplines and movements.

This paper offers two related ways forward. First, we advance a theory of expert activism that is grounded in the institutional analysis of “shadow mobilization” (Author 2010, 2011) – a concept developed to describe informal network structures through which academic and government scientists interpenetrate social movements. Second, we introduce a new methodological approach for collecting systematic data on members of this “difficult to reach” sub-population. Our approach, which begins by identifying experts with links to formal organizations within a social movement field, allows us to move beyond case studies of episodic contention that describe the vast majority of extant studies in this area. We illustrate the theory and the method with a comparative analysis of expert activists in the Louisiana environmental justice movement (LEJM) and the Washington alternative agriculture movement (WAAM). Our central aim in pursuing this comparison is to establish the phenomenon under study by investigating whether shadow mobilization is characteristic of expert activism as it interpenetrates two very different kinds of technology-oriented social movements. We begin by situating the problem of expert activism within the broader context of changing science-society linkages in the contemporary historical era of neoliberalism.

EPISTEMIC MODERNIZATION AND FRACTAL KNOWLEDGE POLITICS

Epistemic modernization provides the general context for this study. The term was coined by David Hess (2007; see also Moore, Kleinman, Hess and Frickel 2011) to describe the growing permeability of the scientific, political, and industrial fields to both partnerships with and opposition from various civil society actors, including social movements. Epistemic modernization emerges in response to three broad historical changes that affect the relationship between expertise and society. The first is neoliberal ideology and policy, which in the US and

Europe has been ascendant since the 1970s. Under the market-oriented logic of neoliberal government, scientific and technological activities once associated with a relatively autonomous university system are becoming increasingly commercialized. Where once research agendas and course curricula were set by communities of experts, increasingly university administrators, state legislatures, and their industrial clients are playing active roles in academic intellectual life, often treating questions about course offerings, degree programs, and research initiatives as business decisions aimed at revenue generation and market creation. These changes have made scientific research more important and more politicized, and thus they have increased social movement scrutiny.

As academic research has become more commercialized, policy-making has become more scientized. A second historical condition of epistemic modernization, the scientization of politics was originally described by Jürgen Habermas (1970: 62) as involving an increasing orientation of state actors “to strictly scientific recommendations in the exercise of their public functions.” Today, governments increasingly rely on science and technology to achieve, maintain, and strengthen their competitive positions in policy domains. As scientization has intensified, narrowly technical debates among experts have come to replace broader debate based on moral argument and social values (Kinchy 2012).

A third historical change is the growth of public participation in policymaking which operates inversely to scientization. As Ulrich Beck (1992) argues, ecological and health risks derived from science and technology have conditioned reflexive societal responses. Non-expert citizens are not only increasingly aware of the existence of such risks, they also understand the inability of experts to control the chemical, genetic, and nuclear hazards that produce risk. Even more, they understand experts’ inability to calculate the limits of what Beck calls “unknowable”

risk. This deep critical awareness is manifest in a broad push to open up both scientific research and technological policymaking through traditional forms of social protest against “large technological projects” (Rucht 2002), but also through consensus conferences, community-based and participatory research, science shops, and other deliberative and participatory institutions that, in different ways, seek to breathe moral debate and social values back into narrowly framed technical decisions.

Many scholars see these three broad and interactive sets of changes – involving increased commercialization, scientization, and public participation – as working to erase the cultural boundaries demarcating science from the larger society and for fundamentally reconfiguring scientific research and rewriting science’s “social contract” (e.g. Gibbons 1999). We remain skeptical that the old politics of science are being replaced by new ways of doing science that are more fluid and more inclusive, and less constrained by disciplinary hierarchies and resource inequalities (Gibbons, Limoges, Nowotny, Schwartzman, Scott and Trow 1994). Rather, we see epistemic modernization as resulting from greater demand for experts in markets, greater reliance on experts in public policy, and other changes that lead to growing civic concern about the intrusion of expertise into social life. Such conditions do not erase boundaries but multiply them, resulting in what we might usefully understand as a “fractal” politics of expert knowledge.

In geometry, fractals are phenomena exhibiting self-similar patterns at different scales. Snowflakes, river systems, and heart rates are common examples drawn from nature; “social” fractals are found in the price fluctuations of stock markets, Indian temple architecture, and some indigenous hairstyles and art (see Eglash 1999). In *Chaos of Disciplines*, Andrew Abbott (2001) uses fractals as a metaphor to describe the reproduction of academic cultures. He notes, for example, that the objective/subjective “split” between social and natural sciences is also

replicated within the social sciences and that debates over the relative value of analytical vs. narrative approaches waged among social science historians and historical sociologists illustrate this fractal patterning of academic dispute (pp. 114-118). For Abbott, such arguments have a functional quality in that they allow different camps to stake out and occupy distinct niches within the academy. For this reason, he argues, academic debate rarely resolves into consensus among competing camps; instead, the debates are continually revisited, as new camps multiply and seek territory to claim as their own.

We argue that knowledge politics waged across the science/society divide can also express self-similar, fractal-like patterns and that such disputes are similarly more likely to replicate than to resolve. This is because epistemic modernization multiplies interactions among experts and non-experts in ways that reproduce science/society boundaries rather than blur or erase them. Today knowledge politics are proliferating in fractal fashion – not only within traditional policy domains, but also in science, government, industry and civil society. Contemporary scientific controversies often become deeply entangled in political questions while social movements now regularly deploy as well as challenge expert knowledge claims. Climate change, abortion rights, vaccination programs, and internet security are just a few of the many issues that bring politics and science crashing together across the broad domains of science and society, but also reverberate within movements and scientific disciplines, and then again within movement organizations and scientific associations and research specialties. Thus, for example, the relative merits and dangers of natural gas development define in broad terms a fight between environmentalists and industrialists, both backed by different kinds of science. But more or less the same controversy has been waged simultaneously within the environmental movement – between organizations such as the Sierra Club who initially saw fracking as a way to offset

global carbon emissions from coal and other groups such as the Natural Resources Defense Council who are more concerned about the regional ecological consequences of “fracking” – as well as inside the expert fields of geology, seismology, ecology, medicine and public health (see Hannigan 2014, Chap. 9).

In this way, the fractal dynamics of knowledge politics under epistemic modernization virtually ensures that researchers will continue to find evidence of more activism in science and more expertise in movements. Importantly for our argument, this increased participation is not erasing or even tempering the resulting planes of conflict, but multiplying those struggles and, for expert activists, compounding the risks that their involvement brings to themselves, their professional communities, and the movements whose goals they work toward. We believe fractal knowledge politics also alter the kinds of questions social movement scholars need to be asking. With expert penetration into social movements increasingly common and increasingly contentious, research and theory now needs to focus less on the simple fact of expert participation in social movements and more on the social mechanisms that organize expert mobilization. Specifically, what organizational forms does expert activism take?

SHADOW MOBILIZATION

A new framework useful for studying fractal knowledge politics is “shadow mobilization” (Author 2010). The term refers to the operation of partially submerged networks that interpenetrate social movements by linking experts to one another and to movement organizers and activists “under the radar.” As such, these mobilizations operate “in the shadows” but they also “shadow” or otherwise move with social movements, sometimes following them and sometimes leading them. As theorized, shadow mobilizations are multidisciplinary expert

networks. They are also trans-institutional, connecting experts in academia, government and industry to social movements and other civil society actors. These different kinds of cross-disciplinary and cross-institutional ties represent the fractal-like proliferation of knowledge politics, each connection developing as points of dynamic tension or struggle along multiple institutional, professional, and cultural boundaries. Depending on whether or how those tensions resolve, shadow mobilizations can function as valuable sources of social capital or as political and professional liabilities for individuals, organizations, and movements.

In addition, shadow mobilizations are dynamic networks, characterized by structural instability. This is in part because the expert-expert and expert-organizer ties of shadow mobilizations are largely informal and fluid. Stalwart, long-term commitments within these networks exist, to be sure, but these do not appear to be the modal form of engagement. Rather, most experts become activists sporadically. This is because their interest in or ability to engage in political struggle is often constrained by professional work responsibilities (Bliss 2012). As a result, for most experts activism is latent, not overt and comes as occasional or even “one-off” interaction. The dynamic is also similar from the social movement side, but for a different reason. While many well-resourced social movement organizations build scientific expertise in-house (e.g. Jamison 2001), most will utilize outside experts on an as-needed basis. And, those organizational needs change – sometimes rapidly – as political winds shift, campaigns alter course, and strategies are revised. Under these conditions, individual experts with specific skill sets bring important but short-term value to social movement organizers.

Thus, the supply of experts available to movements and the demand for expertise from movements are both volatile. Under these conditions, shadow mobilization becomes conceptually meaningful not because it represents a set of durable ties that overcome the

challenges of institutional and disciplinary boundaries, but because most ties are short-lived, uncertain, and contentious: a multiplicative fractal politics of knowledge. And, the sporadic nature of most expert activism contributes to shadow mobilizations' relative social invisibility. This percolating dynamic, with individual experts continuously moving into and out of their engagement with social movements, helps to shield the collective nature of expert activism from public as well as scholarly view – the *shadow* mobilization.¹

Yet if shadow mobilizations are dynamically instable, they are not without structure. Formal organizations anchor these networks by providing expert-activists with institutional resources and, when necessary, political cover. Politicized factions of professional societies (Kinchy 2006), “activist” academic departments and sympathetic offices within government agencies (Author 2010), public interest organizations (Moore 1996), social movement support organizations (Tesh 2000), and various other “counterpublics” (Hess 2011) can serve this purpose. Importantly for this study, shadow mobilizations anchored in different kinds of organizations will benefit from the diversity of resources that heterogeneity affords for sustaining and protecting the fragile expert-activist networks as an “intellectual opportunity structure” (Frickel and Gross 2005; Waidzunas 2013). All else equal, the greater the organizational diversity within a shadow mobilization, the more experts will be available for movement organizers to mobilize and the broader the skill sets that pool of experts will have to offer. But there is a tradeoff: with too many formal organizations, the relative invisibility of shadow mobilization is diminished and the advantages of operating under the radar may be lost.

THE NEED FOR A NEW METHODOLOGICAL APPROACH

Investigation of shadow mobilizations requires a new methodological approach. Most studies of expert activism focus on localized episodes of protest or the activities of individual social movement organizations (SMO), following whatever experts may emerge as visibly significant actors within the parameters of each case. While this approach produces in-depth understanding of expert activism in specific contexts, it is less well-suited to studying the broader dynamics of interpenetration and resulting patterns of fractal knowledge politics across social institutions which most interest us.

Our aim is to identify as many experts participating in LEJM and WAAM as possible – including experts whose participation may be sporadic rather than ongoing, or who may not self-identify as “activists” or who, for various reasons, may prefer to work behind the scenes. But because we are interested in the organization of expert activism rather than with the organization of social protest (which may or may not involve expert participation), we define “expert activist” conservatively, as individuals holding graduate degrees in a particular profession or field of research who use their academic skills and credentials to further social movement goals (McCormick 2009). Our definition excludes scientists whose participation in social movements does not derive from the intellectual capital they possess as scientists. It also excludes those “lay experts” or “contributory experts” who lack formal training and credentials linking them to systems of higher education and research careers (Carolan 2007; Collins and Evans 2009).

Data Collection

For both social movements data collection proceeded in three steps (see Table 1). In Step 1 we identified relevant SMOs operating in a region (south Louisiana) or state (Washington) and conducted in-depth semi-structured interviews with organizers from each SMO.² These initial

interviews were wide-ranging, designed in part to solicit information about organization history, governance structure, political goals and protest strategies as well as to gain understanding of broader movement history and dynamics, including relationships with other SMOs, protest targets and challenger organizations. We also probed organizers for information about how SMOs identified and mobilized different experts, the different roles those experts play or had played in the organization, and their impacts in shaping the organization's culture and political goals. At the end of each organizer interview we requested names and contact information for all current and past experts who had interacted with the organization in any way to further movement goals.

[Table 1 about here]

Step 2 involved in-depth semi-structured interviews with the experts identified through the organizer interviews in Step 1. In this second wave our interviews focused on experts' work with different SMOs – how and why they became involved, what kinds of activities their involvement entailed, and how their involvement in a social movement had influenced their professional relationships, their approach to research, and their general views on the relationship between science and politics. We also asked questions about family background, education and occupation history, work life, and personal experiences of politicization and mobilization. As before, we ended each interview with a request for the names and contact information of additional experts who interviewees knew personally and who were similarly engaged in social movement activities.³ Finally, in Step 3 we combined the lists of expert names generated from the interviews conducted in Steps 1 and 2. Using online searches and email we then collected

additional information from these experts' personal and professional websites and curriculum vitae, which we then coded and compiled into a database.

The result of this three-step data collection effort is a unique database containing information on educational background, current primary employment (institution, position, rank), and occupational history for 178 expert activists complemented by interview data for 37 expert activists and 16 SMO organizers in two state-based social movements. Seven experts were dropped from the present analysis because they lack graduate degrees, leaving 171 valid cases. While not representative of a general population of expert activists (a population that remains poorly understood), these data do offer a far broader picture of expert activism than can be achieved through ethnographic case analysis alone. We use these data comparatively to assess whether expert activism takes similar forms in two different movements in different regions of the U.S.

Comparative Design

Our data collection strategy allows us to exploit a contrasting case comparative design. Both movements rely heavily on experts and thus encourage shadow mobilization, but structural opportunities and cultural practices patterning fractal knowledge politics make expert mobilization relatively easy to achieve in one and quite difficult to achieve in the other. At issue in drawing the comparison is whether shadow mobilization is a form of expert organization that characterizes one or both of these quite different movements.

LEJM represents a hard case for organizing expert activism. This movement's primary constituency is residents of "fenceline" communities. These are small villages or neighborhoods in larger towns and cities that lie adjacent to any of the more than 140 petroleum refineries and

chemical plants situated along the lower Mississippi River (Cernansky 2011). Residents of these fenceline communities are predominantly African Americans with low family income and education levels, few of whom find stable employment in the industrial facilities next door. Here, environmental injustice is etched into the history and geography of antebellum agriculture; many residents trace their family's ancestry to the slave plantations once occupying the same acreages that refineries and chemical plants occupy today (Roberts and Toffolon-Weiss 2001). In the contemporary industrial economy, residents – and especially children – face adverse health consequences which many believe derive from chronic exposure to industrial pollution (Lerner 2005).

In this context environmental scientists and health experts can be particularly valuable to the region's few environmental justice organizations working to organize fenceline communities, challenge industry claims about the absence of health risks, pressure regulatory agencies to enforce or bolster existing rules, and to draw broader public attention to the unequal environmental burdens the residents of "cancer alley" face on a daily basis (Allen 2003). Yet cultural and economic differences separating professional scientists and residents of these underserved communities are substantial. Structural inequalities and power differentials between the two groups make bridging the gap difficult to achieve and even less likely to maintain in ways that result in meaningful and positive social change (Ottinger 2013).

In comparison to LEJM, WAAM is geographically and culturally more diverse and economically more privileged. Its predominantly white college-educated constituency is made up of rural producers working small, family-owned farms and urban/suburban eco-conscious consumers of organic meat and produce. Activists criticize what they see as the ecologically destructive and politically coercive structure of industrial agriculture, illustrated by the rapid

consolidation of the seed crop industry, the industrial capture of agricultural science, and the cooptation of organic labeling and certification programs (Carolan 2012; Pechlaner and Otero 2010). About 30 Washington-based non-profit food and farming organizations sustain the movement, coordinating action between the movement's producer and consumer poles in advocating for sustainable farming practices and equitable access to organic food, i.e. "food justice" (Alkon and Agyeman 2011).⁴

Through its close connections to Washington's Land Grant University system WAAM also offers comparatively greater opportunities for mobilizing experts than LEJM. Researchers from Washington State University's (WSU) agricultural research and extension programs working with WAAM take on a wide range of roles: some focus on linking together members of the movement with policymakers or scientists who can help them to develop sustainable farming practices while others engage in lobbying campaigns or other more public demonstrations of dissent against industry. While the Land Grant system was originally designed to deliver one-way university-to-farm knowledge transfer through agriculture extension services (Goldberger and Buttel 2000), today these traditional institutions as well as newer organizations such as the university's 4-acre organic farm (certified in 2004) and Center for Sustaining Agriculture and Natural Resources (est. 1991), represent public resources that can facilitate three-way interaction among organic farmers, activists, and experts. These linkages denote a different and more complex network structure than the farmer-to-farmer networks in Wisconsin studied by Hassanein (1999). Thus, even as neoliberal agriculture policies increasingly favor corporate agribusiness and chemical intensive farming practices, inter-organizational linkages are helping to democratize knowledge production and incubate grassroots efforts consistent with WAAM goals (Author 2012).

While both movements value expert knowledge and encourage participatory research as resources that further community-oriented social justice goals, key differences make the comparison particularly instructive. The LEJM has access to fewer economic resources and is supported by far fewer NGOs. It also has far more limited access to public institutions: there is no Land Grant Extension Service equivalent in south Louisiana's environmental health sector that provides built-in mechanisms for mobilizing sympathetic experts into the movement.

These resource-based differences are accentuated by the different social positions and logics that inform movement organization and political strategy. LEJM represents a constituency that is largely excluded from the production decisions that generate environmental risk; Mississippi River fenceline communities are involuntary consumers of industrial pollution. In contrast, WAAM includes and works on behalf of organic producers and consumers, both of whom directly influence market decisions. Where LEJM constituents are excluded from the market logic of chemical production, members of WAAM inform and to some extent contribute to the market for organic goods (Guthman 2004). These positional differences help explain the two movements' different political logics, with LEJM focused primarily on influencing regulatory agencies' governance of industrial hazards and WAAM focused primarily on policies that enhance economic and political opportunities for organic growers and limit the economic and political power of industrial agribusiness. It remains an open question whether these different political logics have implications for how and how successfully each movement mobilizes experts.

SOCIAL AND PROFESSIONAL CHARACTERISTICS OF EXPERT ACTIVISTS

Who are expert activists? What do they study? Where do they work? Where else do they work? In answering these questions, our analysis relies heavily on biographical data collected from CVs, resumes, and website bios to examine the social and professional characteristics of expert activists as they interpenetrate the two social movements. We reserve material collected from in-depth interviews for use in a different analysis.

Gender, Rank, and Training

Table 2 summarizes data on gender, PhD or equivalent degree, and field of highest degree among experts mobilized into LEJM and WAAM. Clear similarities in gender composition and highest degree are apparent across the two movements. Our data show that in both movements experts are predominantly men. Women make up just over one-third of expert activists in both samples, with the proportion being a little lower in LEJM (32%) and somewhat higher in WAAM (39%). Data also show that nearly three-quarters of experts in both movements have attained the highest level of education possible, with 72% in each sample holding PhDs or equivalent degrees. The expert networks in these movements are not only highly educated, but deeply educated as well. The vast majority of experts in both movements hold multiple degrees in some combination – for example, those holding dual Master’s degrees, a traditional Master’s/PhD combination, or even dual PhDs (data not shown).⁵

[Table 2 about here]

Table 2 also describes the disciplinary distribution of expertise across the sampled populations. The main general finding is that both movements draw on a broad range of

expertise. LEJM experts have graduate degrees in seven of eight major disciplinary categories, with only the humanities not represented in the sample. Within that broad range, public health and medical sciences are the most common, combining for more than half of total (54%). The social and policy sciences and the biological and earth sciences together account for another 30% and these are followed by professions (primarily lawyers) which contribute about 7%. Experts with advanced training in engineering and the chemical and physical sciences are at the low end of this distribution, with 4% and 3% respectively. Overall, while LEJM has mobilized a broad range of expertise, successful mobilization has concentrated in sciences of medicine and public health – the kinds of experts who would have the most to contribute to a social movement that targets disparities in environmental health risks.

Experts in WAAM also bring skills from a broad range of fields, with only engineering and the chemical and physical sciences not represented. But across this broad range of expertise, WAAM experts are less evenly distributed: those with training in biological and earth sciences represent over 52% with the social and policy sciences making up a distant 13%. No other field of expertise in our sample contributes more than 4%. The high concentration of expertise within the biological and earth sciences also makes intuitive sense. We would expect a social movement seeking changes in the social organization and ecological impacts of agriculture to seek out and attract disproportionate interest from the biological and earth sciences. These are experts who know something about plants, animals, and soils. Depending on their institutional locations, WAAM experts are also likely to have direct professional interests in protecting Land Grant research on organic and heirloom varieties against industrial agribusiness interests that concentrate research support on major cash crops.

Overall, academically trained experts bring a wealth of skills, experience, and knowledge to both movements. But that expertise concentrates in specific areas of science – medicine and public health for LEJM, and biology and earth sciences for WAAM. Notably, the distribution of expertise in each is uneven, favoring the kinds of knowledge the different movements are most likely to need. This may suggest that shadow mobilization is best investigated as a strategic process involving recognition of mutual interests by movement organizers and individual experts. From this perspective, gender seems to be a significant factor in shaping the mobilization potential of different experts, as women experts are underrepresented in both movements. While national data show that the majority of PhDs in health sciences, life sciences, and social sciences are earned by women, and women earn 44% of PhDs in agricultural sciences (National Science Foundation 2012), women experts represent less than 40% of our sampled population. This imbalance is particularly acute – and notable – in the realm of environmental justice where grassroots movements tend to be women-led (Rocheleau, Thomas-Slayter, and Wangar 2013). Clearly, the social factors and mechanisms structuring expert recruitment into social movements deserve more systematic attention from researchers that the topic has thus far received.

These comparative data also lend provisional support to our starting premise that the real power of expert mobilization lies in the diversity of resources experts bring to movements as individuals, combined with their potential to *collectively* impact movement outcomes. The extant literature's tendency to focus on the intellectual capital that specific individuals wield during moments of episodic contention belies the broader possibilities that open to social movements when expert activism is coordinated to take advantage of the multidisciplinary bank of resources that mobilized experts represent as a group.

Employment by Sector

To better understand the conditions under which expert mobilization occurs, Table 3 presents information on the institutional settings where expert activists work. Not unexpectedly, solid majorities in both movements are employed in colleges and universities. More strikingly, the vast majority of these academic experts are in tenured positions – 85% in LEJM and 76% in WAAM. The prevalence of tenured experts likely reflects the risks involved in taking up social movement activism. Tenure offers expert activists insulation from economic risks that those in non-tenured positions typically do not enjoy (Delborne 2008). In this way, the structure of tenured vs. non-tenured academic employment provides selective opportunities for expert mobilization. In addition, academic job security is gendered, with inequality among female and male professors increasing as rank increases (National Science Foundation 2008). This may help explain the gender imbalance we described in Table 2, as those tenured professors most insulated from institutional backlash tend to be predominantly male. The dual structuring of academic experts by rank and by gender is likely to influence the mobilization potential of would-be expert activists.

[Table 3 about here]

The academy is distinct in providing economic security for its tenured employees. Other employment sectors do not provide such security and opportunities for mobilizing experts differ accordingly. For example, the risks of “crossing the line” into social movement activism is more likely to be a non-issue for experts working in the non-profit social movement sector. Non-

governmental organizations are the second largest employment sector for expert activists in both movements, suggesting that people with research backgrounds who are deeply committed to social change may be attracted to employment in social movement or other civil society organizations where, presumably, some form of advocacy is tolerated if not actively encouraged.

Self-employed expert activists working for example as farmers, family doctors, or owners of small technology or consulting businesses may face yet another set of economic and professional risks. For these entrepreneurs, who account for 3% of experts in LEJM and 4% in WAAM, social movement activism can provide entrepreneurs with market opportunities when their business practices target the needs and interests of social movement constituencies. Farmers can offer farm tours to model sustainable farming practices and attract new recruits; or technologists can offer lower-cost air monitoring equipment designed to meet the needs of environmental justice communities. On the other hand, these same practices might result in losing clients or missing market opportunities. Such risk can occur when attention to social movement activism diverts their attention from their business or because activism damages their professional reputation and legitimacy.

Expert activists employed by industry face similar kinds of risk but, unlike self-employed experts, do not have the luxury of deciding to not fire themselves for transgressing professional norms or violating an employer's trust. Experts working for industry are likely to face formidable disincentives – both material and ideological – to engaging in activism, especially when that activism targets their employers. On the other hand, their social location within corporate organizations can make them uniquely valuable sources of information for social movements. So while they account for just 1% of our samples, the fact that our data collection efforts uncovered any expert activists working in industrial settings at all is, we think, highly

significant. In neither case, however, did these experts work in industries directly implicated in their advocacy for environmental justice or alternative agriculture, perhaps underscoring the nature of the risks undertaken by those who are.⁶

Like their counterparts in industry, experts employed by agencies of state and federal government offer distinct advantages to social movements. These advantages derive not only from their intellectual capital as scientists but also from the organizational and policy knowledge many are likely to possess. Unlike industrial employees, however, government researchers occupy professional positions that commit them to serving the public good, variously defined. In theory at least, these experts seek to balance public interests in ecological and societal well-being with economic growth. In that respect, government experts' interests in the production and dissemination of knowledge toward the public good bear strong similarities to the interests of many social movements and marks them as important conduits of information and strategy between movements and the state. Of course, government-employed expert activists can also channel their influence in ways that facilitate the cooptation of movements by more powerful state actors.

Three observations emerge from the data presented in Table 3. First, scientists engaged in social movement activism from different employment sectors likely face different kinds of risks. These risks, whether perceived or actually experienced, can be economic, professional, or political or – more likely – some combination of the three. Second, expert activists' work settings also provide different kinds of institutional knowledge, apart from their specific areas of scientific expertise, and these knowledge interests are likely to be configured in ways that can differently influence expert mobilization. Third and most importantly, we find experts represented from all employment sectors and in roughly similar proportions in both movements

suggesting that shadow mobilization extends beyond any one social movement. Together, these observations tell us that expert activists navigate different forms of risk to bring to social movements a range of institutional and expert knowledge and skills from a variety of occupational contexts. Such capital is not only scientific/technical, but political and organizational as well, providing social movements with a pool of diverse resources. The challenge for social movements then becomes one of organizing experts in ways that maximize the effectiveness of their combined talents.

“Revolving Door” Careers

The cross-sectional heterogeneity of expert activism described in Table 3 can also be investigated longitudinally. We do this in Table 4, which summarizes historical data on expert activists’ employment histories. This approach allows us to better understand whether expert activists build careers within a single employment sector, such as academia or industry, or whether they pursue employment opportunities in different employment sectors - e.g. academia *and* industry - over time. We think the difference is significant because careers that take experts into different work environments afford those individuals opportunities to accumulate greater diversity of experiences and relationships which can build social capital for movements. Using all information available to us, we coded for different (paid) jobs held by the people in our sample. Because complete historical data was not available for everyone and because we did not count unpaid work as employment (e.g. scientists serving as volunteer advisors for non-profit organizations), the picture that emerges from the data almost certainly underestimates experts’ mobility across sectors. Even so, Table 4 presents clear evidence of extensive cross-traffic.

[Table 4 about here]

In LEJM, 65 percent of expert activists have worked in at least two employment sectors and more than a quarter of them (28%) have worked in three or four. Conversely, only 35 percent of LEJM expert activists have worked in only one sector during their professional careers. In WAAM the split is about 50-50, with half of expert activists working in a single sector and the other half exhibiting some cross-sector mobility. Compared to LEJM, a smaller proportion (7%) of WAAM experts have worked in three or four different sectors.⁷ In both samples, reported percentages of one-sector experts may be overstated to the extent that graduate students and early career scientists may simply have not yet had sufficient time to develop the diverse multi-sector employment experiences. Of course, we cannot tell with available data whether the levels of cross-sector mobility we show for expert activists in these two social movements are comparable to trends in the general population of experts, but these findings hold significant empirical and theoretical value nonetheless.

For both movements the pools of expertise appear to be constituted through a revolving door dynamic that circulates expert activists into and out of different institutional and work settings. This dynamic seems to be prominent and has at least two important implications for our understanding of expert activism. One involves the fact that individual experts with work experiences spanning multiple employment sectors are likely to accumulate a greater diversity of personal skills and experiences than experts who spend their entire careers working in one sector, for example as a lifetime academic. All else equal, social movements will stand to benefit more from the former than the latter. Moreover, as they move from one employment sector to another these same experts will also accumulate a greater diversity of relationships with other experts.

We expect that the relative density and heterogeneity of professional ties will increase as a revolving door dynamic shapes expert career trajectories. Increasing indirect ties among experts can in turn greatly expand the mobilization potential of social movements – again provided movement organizers are aware that they exist and can capitalize on that knowledge.

CONCLUSION

This paper advances understanding of expert activism in four ways. We develop an institutional argument for the significance of expert activism that is grounded in the problem of “fractal knowledge politics” that we believe is becoming more pronounced in an era of epistemic modernization; we build on earlier work (Author 2010, 2011) that introduced the concept of “shadow mobilization” as a form of meso-level interpenetration of science and social movements; we present a new approach for uncovering these partially submerged expert networks; and we present information on the professional and social characteristics of expert activists in social movements for environmental justice and alternative agriculture.

These data show that the two shadow mobilizations are similar in many of their basic features. Both mobilizations are predominantly male, very highly educated (most mobilized experts hold PhDs), and are broadly multidisciplinary but with concentrated expertise in fields patterned on each movement’s central political goals related to public health (LEJM) and agriculture (WAAM). Majorities in both mobilizations hold tenured academic positions (with NGOs coming second), but all employment sectors are also represented in each. And there is strong evidence in both mobilizations of a revolving door dynamic in employment trajectories although this is somewhat less pronounced in WAAM, probably reflecting the importance of

agricultural extension services in providing a built-in channel for interaction between agricultural scientists and WAAM organizers and constituents.

We believe these findings “establish the phenomenon” of shadow mobilizations as a hidden feature of these two technology-oriented social movements (Merton 1987), but a richer understanding of their submerged networks awaits further research. Three issues strike us as particularly worthy of additional study. The first issue concerns the role that intellectual opportunity structures play in conditioning mobilization potential among professional scientists (Waidzunas 2013). Shadow mobilizations emerge from a complex institutional matrix involving social movement, state, and private sector actors and it will be instructive to understand how these institutional arrangements condition or constrain expert recruitment. Our study begins to shed light on the ways that gender, academic tenure, and employment as well as historical institutions such as agricultural extension services structure opportunities for expert activism, suggesting this as a fruitful line of inquiry. Second, we also need to better understand the actual networks that we theorize to be constitutive of shadow mobilization. Toward this, research might pay particular attention to the density, centrality and heterogeneity of network ties as well as other structural network features (e.g. their scale, scope and stability) that can provide formal measures of the interpenetration of experts and social movements. The third issue we think deserves more study involves mobilization processes. How do experts become involved in shadow mobilizations in the first place? What mechanisms operate to push or pull experts into political engagements with social movements? How do shadow mobilized experts negotiate their dual roles as experts and social movement supporters (Author 2011)? Collectively, these three lines of inquiry encourage research that combines different methodological approaches for collecting and analyzing data. As our own work on the topic bears out, finding submerged

networks can be difficult and time consuming, but we believe the intellectual advantages gained by bringing shadow mobilization further into the light justify the extra effort.

As we see them, shadow mobilizations are strategic collective responses to cumulative risk in contemporary society. Provisionally they respond to the ecological, economic, and health risks that movement activists and constituents face on a daily basis. But because shadow mobilizations multiply points of struggle along the science/society boundary they also create additional risks – including risk of cooptation for movement organizers and professional, political, financial risks for expert activists. That this matrix of risk is experienced as actual threat is reflected in the high percentage of tenured academic scientists in our study and the difficulty we had gaining access to some people who didn't want to be interviewed or who more often refused to identify others. Thus, the submerged nature of these expert networks is one of the central and more interesting features of shadow mobilization. This makes shadow mobilization difficult to study in a systematic way. It also raises ethical implications for (us) researchers because mapping the organization of expert activism in shadow mobilization is designed to generate politically sensitive knowledge that movement opponents may also value, compounding even further the risk of “outing” a hidden network in the name of “systematic” or “robust” social science. This dilemma, we submit, is further evidence of the fractal nature of knowledge politics, from which even researchers studying the phenomenon cannot easily escape.

NOTES

1. A similar come-and-go dynamic can also shield expert activists from one another.

2. Research on expert activism in LEJM began as an informal pilot study conducted in South Louisiana by the first author from 2003-05 and is based on a convenience sample of regional environmental justice organizations. The study of expert activism in WAAM was conducted in 2009-11 as a Master's Thesis project by this paper's second author (Author xxxx) and used the *Encyclopedia of Associations for Washington State* (2008) to more systematically identify relevant organizations advocating for alternative agriculture.
3. Time and funding constraints prevented us from interviewing this list of second-wave expert activists for this study.
4. Research on "the organic movement" in the U.S. often conflates market based politics with social movement activism (Guthman 2004). Our use of the more specific term "alternative agriculture movement" avoids this problem by recognizing that markets influence politics in ways that allow for movement mobilization to occur and that experts must work with organizations to address the structural constraints that "identity" or "consumer" politics cannot.
5. Seven experts in our LEJM sample hold PhDs in two different fields, e.g. physics and history.
6. One was an insurance agent with a graduate education in agriculture science; the other was a researcher in the pharmaceutical industry who advocated for children's environmental health.
7. This difference requires further research but may be explained by the prominence of the agricultural extension system, a set of formal structures that allow agricultural scientists to interact with communities and localized social movements without changing jobs.

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Table 1. Data Collection Strategy

	LEJM	WAAM	Total	
Step 1	• identify relevant SMOs	• 3 SMOs	• 29 SMOs	• 32 SMOs
	• in- depth interviews with organizers	• 3 organizer interviews	• 13 organizer interviews	• 16 organizer interviews
	• identify expert activists (wave 1)	• yields 32 expert contacts	• yields 40 expert contacts	• 72 expert contacts
Step 2	• in-depth interviews with expert activists	• 24 expert interviews	• 13 expert interviews	• 37 expert interviews
	• identify expert activists (wave 2)	• yields 76 additional contacts	• yields 35 additional contacts	• 111 additional expert contacts
Step 3	• collect biographical and career data from experts' <i>curriculum vitae</i> and personal web pages	N = 97	N = 73	N = 170 (out of 183 experts identified in Steps 1 and 2)

Table 2. Expert Activists by Gender, PhD Status, and Field of Highest Degree

	LEJM (N = 97)	WAAM (N = 73)	Total (N = 170)
Female	32 (.33)	29(.40)	61(.36)
PhD or equivalent ^a	71(.72)	53 (.73)	134 (.78)
<i>Field of Highest Advanced Degree^b</i>			
Professions	8 (.08)	3 (.04)	11 (.06)
Humanities	2 (.20)	3 (.04)	5 (.03)
Engineering	4 (.04)	0 (0.0)	4(.02)
Social & Policy			
Sciences	13 (.13)	10(.14)	23(.13)
Medical Sciences	18 (.19)	2 (.03)	20(.12)
Public Health	21 (.21)	1 (.01)	22(.13)
Biol/Earth Sciences	14 (.14)	39 (.53)	53(.31)
Chem/Phys			
Sciences	3 (.03)	1 (.01)	4 (.02)
Missing	14 (.14)	14 (.19)	28(.16)

Notes:

- a. “Equivalent” degrees to the PhD in this data set include J.D., M.D., D.V.M., and D.P.H.
- b. Master’s level work or higher.

Table 3. Expert Activists by Primary Employment Sector

	LEJM (N = 97)	WAAM (N = 73)
Academic	58 (.59)	41 (.56)
Academic , with tenure	49 (.85) ^a	32 (.78) ^a
Government	10(.10)	3 (.04)
NGO	20 (.20)	24 (.33)
Small Business	9 (.09)	3 (.04)
Industry	1 (.01)	1 (.01)
Missing	0	1 (.01)

Note:

- a. Percentage calculated from the total number of academic experts in each sample (N=58 and N=41).

Table 4. “Revolving Door” Careers among Expert Activists

	LEJM (N = 97)	WAAM (N = 73)
Employed in one sector	34 (.35)	37 (.51)
Employed in two sectors	36 (.37)	31 (.42)
Employed in three sectors	21 (.22)	3 (.04)
Employed in four sectors	6 (.06)	2 (.03)