

Facilitating Interdisciplinary Collaboration among the Intelligence Community, Academy, and Industry

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Edited by

Jessica Katz Jameson,
Beverly B. Tyler, Kathleen M. Vogel
and Sharon M. B. Joines

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The editors wish to dedicate this book to Richard Tait. From the day he arrived at LAS, it was evident to all who worked with him that he was a committed public servant and an advocate for collaboration. He inspired us and his presence is deeply missed.

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FOREWORD

GREGORY F. TREVERTON

Many people, including me, have pointed out through the years that the canonical intelligence cycle—from requirements to collection to analysis to dissemination—never really worked that way. It may have been decently appropriate for the Cold War world rife with puzzles about the Soviet Union for which we sought the answers: how many warheads does an SS-19 missile carry, how accurate are they? It cannot be right for a world of ubiquitous information but also intelligence issues that are complexities or “wicked problems,” ones in which many actors, some of them new or unknown, are interacting in ways for which we have no precedents. In that world, one of the central tenets of activity-based intelligence (ABI) is right on the mark: we may have the answer before we know the question.

In that world, the Laboratory of Analytic Sciences (LAS), the subject of this rich book, is not just an impressive venture in collaboration, it is a look at the way intelligence analysis should be done in the 21st century. It is just what I and my Swedish colleague, Wilhelm Agrell, had in mind some years ago when we called for hybrid organizations in which “experts, policymakers, and stakeholders are linked not just through a requirement-dissemination loop but interact on a more continuous and integrated basis” (2015, p. 197). It brings intelligence analysts, who have a practical understanding of needs and tradecraft, together with university experts from many disciplines and colleagues from industry, who bring knowledge of the latest technologies, and are also enriched in their understanding of analysts’ needs, so that new tools are less likely to bring the later rebuke from those analysts “that’s not what I need.” The three groups work arm-in-arm from the beginning in what LAS refers to as “immersive collaboration.”

The book’s chapters One through Four lay out, first, the driving motivations and basic frameworks for LAS, with due attention to the tensions at play in the kind of collaboration the Laboratory seeks. Chapters Five and Six focus on the interventions, processes, and technology necessary to support immersive collaboration, and chapters

Seven through Thirteen share case studies of collaboration at work. The cases are especially interesting as they demonstrate the kinds of work done at LAS, the challenges that were faced and how they were managed, illustrating the possibilities of these partnerships.

For instance, in the run-up to the 2016 Summer Olympic Games in Rio de Janeiro, Brazil, LAS formed a 15-member LAS Team of researchers and analysts from NSA and other U.S. Intelligence Community organizations, North Carolina State University professors and students, and industry collaborators. It illustrated another tenet of the LAS approach, drawing on open sources and so keeping the work unclassified for as long as possible. LAS Team developed a variety of innovative open source tradecraft and analytics to support a range of U.S. Intelligence Community officers during the Rio games. The team shared its unclassified analytic results that were used then to enrich classified analysis. The Rio project issued into an ongoing effort, described in Chapter Ten, to develop tools for selecting and organizing open source data, and methods for using it analytically—a critical area where the Intelligence Community has lagged behind commercial enterprises.

In another case, LAS employed agent-based modelling (ABM) to probe illicit networks—an example of an intelligence complexity. Plainly, running experiments on illicit networks is impossible, so ABM offers rich simulations, with agents, rules for their behavior, and an environment in which they operate. ABM also played well to LAS strengths, for the models, usually with many actors, require broad interdisciplinary teams. Content specialists, such as anthropologists, economists, sociologists, and psychologists provide the richness, but then the challenge remains translating their ideas into high-level machine code. No topic or idea would belong only in one content specialist’s domain; and when a topic was hard to communicate across the team, the team relied on the secondary proficiencies of its “bridge” members in order to identify the friction in communicating the concept.

The book’s cases drive home the point that the kind of collaboration LAS represents are relevant not just for the Intelligence Community but beyond for those in relevant fields of education, or anyone interested in collaborating with government agencies.

—Gregory F. Treverton, October 22, 2019

PREFACE

JESSICA KATZ JAMESON,
BEVERLY B. TYLER, KATHLEEN M. VOGEL
AND SHARON M. B. JOINES

The need for collaborative partnerships in the U.S. intelligence community (IC) was laid out in *Vision 2015: A Globally Networked and Integrated Intelligence Enterprise*, a report prepared by the U.S. Office of the Director of National Intelligence (ODNI 2008b). *Vision 2015* made the case that the siloed and distributed model of intelligence that served our Nation in the recent past will not continue to be successful in the fast-paced, interconnected world we live in today. As the *Vision 2015* report describes it:

In this new environment, geographic borders and jurisdictional boundaries are blurring; traditional distinctions between intelligence and operations, strategic and tactical, and foreign and domestic are fading; the definitions of intelligence and information, analysts and collectors, customers and producers, private and public, and competitors and allies are changing. Simply distinguishing between intelligence and non-intelligence issues may prove a major challenge. (5)

Vision 2015 concludes with a call for commitment to integrating policy, people, processes, infrastructure, and technology to optimize intelligence and provide “decision advantage” to IC customers, such as the President, military leaders, and policy makers charged with protecting our Nation and our allies. The same year *Vision 2015* was released (2008b), the ODNI released “Intelligence Community Directive Number 205 (ICD 205): Analytic Outreach,” which charged intelligence analysts to “leverage outside expertise as part of their work.” This mandate directs analysts to identify the leading experts within the knowledge domains that made up their portfolios of analytic work, and to seek opportunities to engage with them to “explore ideas and alternative perspectives, gain new insights, generate new knowledge, or obtain new information,” in order to challenge their assumptions, address cultural biases, and mitigate

groupthink (ODNI 2008a).

Wilhelm Agrell and Gregory Treverton's book, *National Intelligence and Science: Beyond the Great Divide in Analysis and Policy* (2015), further calls for collaborative approaches to intelligence to anticipate future intelligence needs. These authors acknowledge that information deemed irrelevant today has the potential to be relevant in the future, calling for movement from linear to more holistic analysis. The ability to collect information is aided by the proliferation of open-source information available through social media, yet the ease with which anyone can spread information requires increased emphasis on data validation, veracity, and integrity (Agrell and Treverton 2015). Perhaps more than ever, analysts must be part of a dialogue with each other and with the broader community. Agrell and Treverton call for the creation of hybrid organizations in which "experts, policymakers, and stakeholders are linked not just through a requirement-dissemination loop but interact on a more continuous and integrated basis" (197). The subject of this book, the Laboratory for Analytic Sciences (LAS), directly responds to all of these calls.

LAS is a cross-sector academic-industry-intelligence organization that connects researchers from multiple intelligence agencies, industry, and interdisciplinary academic scholars, and serves as a useful model for examining collaborative approaches to intelligence. LAS was founded in 2013 as the largest sponsored research contract in the history of North Carolina State University (\$60 million over five years), with funding from the National Security Agency (NSA). LAS has created teams of intelligence analysts, who provide practical understanding of their needs, customers, and tradecraft, and work collaboratively with university scholars and industry partners of varying disciplines, who bring their expert knowledge and understanding of cutting-edge technologies and/or human behavior. These interdisciplinary teams work side-by-side to produce results that enhance how analysts create integrated and innovative analysis.

Importantly, LAS is unique in that it is a translational big-data research laboratory focused on the development of new analytic tradecraft, techniques, and technology. Translational research is a term LAS borrowed from the medical community that denotes "from bench to bedside"—or in this case, from ideation and research to delivery of practical tools, techniques, and tradecraft for intelligence analysts. One of the key features of LAS is that the technologies and tradecraft they are developing now are aimed at helping future intelligence analysts perform complex, integrated analysis to produce information and intelligence that

meet our nation's most critical needs.

A practical example of LAS work reveals the promise of this type of innovative collaboration. In response to intelligence challenges presented during the 2016 Summer Olympic Games in Rio de Janeiro, Brazil, a 15-member LAS Team was created that included government researchers and analysts from the NSA and other U.S. IC organizations, North Carolina State University professors and students, and industry collaborators. The LAS Team developed a variety of innovative open-source tradecraft and analytics to support a variety of national IC customers during the Rio Summer Olympics. LAS researchers collaborated with other NSA and IC elements to provide and share unclassified analytic results that were used to enrich classified analysis. Upon receiving the prestigious National Intelligence Meritorious Unit Citation (NIMUC) for this work, the LAS Team was called out for "mission engagement, collaboration, and agile teaming with a mix of skills and expertise in systems engineering, data science, visual analytics, mission collections, and program management that enabled the IC mission to monitor and warn of emerging threats to the Rio Olympics" (Office of the Director, National Intelligence 2017). The Olympics project is just one example of the benefits of multiagency and multisector collaboration being realized at the LAS.

While government, industry, and academic partnership is not new, there are two especially unique aspects of the LAS. First, LAS is characterized by an unprecedented level of occupational diversity, including government staff from a variety of agencies, departments, and job classifications (including the presence of Five Eyes partners), as well as academics and industry partners from disciplines as varied as business management, communication, computer science, design, engineering, English, political science, psychology, and statistics. To date, LAS has attracted and funded over 60 faculty members and their students from 20 departments and eight of NC State's ten colleges, as well as faculty from Duke University; George Mason University; Rensselaer Polytechnic Institute; Smith College; University of Maryland, College Park; University of North Carolina, Chapel Hill; University of North Carolina, Greensboro; University of Notre Dame; University of Texas, Dallas; and University of Utah. The inclusion of scholars from the humanities and social sciences, as well as science, technology, engineering, and math (STEM), adds to the lab's disciplinary diversity. LAS has also hosted representatives from over 150 different companies, ranging from one- or two-person startups to large, multinational corporations. Many of these companies have been able to identify a role for their company in the lab's collaboration model and national security mission.

A second distinguishing feature of LAS is its commitment to “immersive collaboration.” The Office of the U.S. Deputy Director of National Intelligence for Analysis, which sets analytic standards and policy across U.S. intelligence, has defined collaboration as “the interaction among members of the Intelligence Community and their partners—exploiting their diverse expertise and organizational resources to create higher value intelligence than an agency or officer can do individually to achieve the mission of the Intelligence Community” (McIntyre, Palmer, and Franks 2009). LAS takes collaboration a step further in defining *immersive collaboration* as a process through which cross-sectoral members share their disciplinary perspectives, cultures, methods, and insights to create a shared, transdisciplinary approach to problem finding and definition, project planning, and solution development.

LAS leaders and participants also engage in continuous and intentional *reflection* on unfolding processes, *observation* of the environment and outcomes, and *imagination* of how collaboration can be advanced and optimized. Indeed, the “reflect-observe-imagine” mantra was an initial core value for how LAS operated, and many of the original LAS participants internalized these ideas in support of a collaborative and innovative atmosphere.

While the LAS can boast several indicators of success in its first five years (recounted in Chapter One), immersive collaboration among diverse participants is hard work. Each sector—government, academia, and industry (and the sub-units within them)—has its unique jargon and acronyms, recognition and reward systems, occupational norms, and work habits. These structures create both physical and social psychological barriers to information sharing, collective sensemaking, and collaborating.

The goal of this book is to document and share what we have learned in the first five years of the lab’s existence about the nature, process, and outcomes of interdisciplinary, cross-sectoral, immersive collaboration in order to better inform academic-industry-intelligence partnerships today and into the future. The editors of this book are academic faculty funded by LAS who were initially brought into the lab to facilitate team collaboration, observe and record processes, develop protocols, and participate in mission-based activities. The four of us represent the fields of business management; communication; science and technology studies, and science and technology policy; and design. We joined the lab in 2014, just six months into the first delivery order, and were part of a larger group tasked with facilitating meetings, observing lab activities, and designing interventions to optimize collaboration. In addition, individual chapters of

this book have been written by LAS staff and LAS-affiliated industry and academic partners. This book represents individual and collective reflection and analysis of hundreds of hours spent in LAS meetings, seminars, workshops, and symposia; interviews with LAS members, visionaries, and customers; surveys of LAS member perceptions and processes; and reviews of relevant scholarly work on action research and engaged scholarship, organizational innovation, interdisciplinary communication and collaboration, and security studies.

Audiences

We believe this book will be of interest to several audiences in the IC, the academy, and industry. There are leaders in the IC, for example, who want to replicate similar cross-sector labs on other academic campuses. Many IC members want insights into how to enhance collaboration and facilitate change in a culture that has privileged individual success and the maintenance of information silos. Examples of change in IC culture include the creation of research centers (see, for example, McIntyre, Palmer, and Franks 2009; Ehrhart 2009), and a group of NSA employees who study and improve collaboration by identifying barriers to cooperation and information sharing among analysts and agencies. Several LAS participants are members of this group, thus providing an important feedback loop as we share our LAS discoveries with them.

Interest in collaboration throughout the IC is also evidenced by the Collaboration Summit held in March of 2016 (see <https://www.govevents.com/details/19303/ic-collaboration-summit/>).

While there was no government mandate to hold this conference, it was organized by U.S. intelligence officers and affiliates from all over the world. There were 500 registrants for this conference and approximately 350 attendees. In addition, previous books, such as Hackman's (2011) *Collaborative Intelligence, Using Teams to Solve Hard Problems* and Agrell and Treverton's 2015 book, described above, also demonstrate the desire to better understand, promote, and improve collaboration and information-sharing processes throughout the IC. These books draw from the fields of psychology and intelligence analysis, respectively, to prescribe best practices for team collaboration and describe the science of intelligence. The current book builds on and extends these predecessors, and others, by integrating academic fields such as management, communication, computer science, and design with our experiences and action research to document what we have learned about the structure, leadership, and interpersonal dynamics over several years with one model

of multiagency collaboration with academic and industry partners. This book also differs from others by exploring all three levels of analysis—program, team, and individual—to promulgate a model for collaboration that can be replicated and adapted to build and sustain immersive collaboration with internal and external partners at the academia-industry-intelligence interface.

The desire for relationships between the IC and academic scholars from a variety of fields suggests there is also an academic audience for a book on IC collaboration. The historical relationship between the IC and the academy was featured in a book called *Cloak and Gown: Scholars in the Secret War 1939-1961* (Winks 1987). This book provides useful historical background for understanding collaborations between the academy and the IC, yet does not provide guidance for creating new collaborations today, when there is a demand to understand how to better connect intelligence and academia. Professor Bowman Miller, at the National Intelligence University, one of the IC's training grounds for analysts, has argued that the IC must increase its engagement with outside experts to facilitate “cross-pollination” of ideas—to bring into the IC the unique depth and time horizon of knowledge that academics possess, and to help intelligence analysts “think outside of the box” (Miller 2010). This sentiment was reiterated at the 10th Anniversary Homeland Defense and Security Education Summit in March 2017 at George Mason University. This conference included 275 federal and state participants representing 14 government agencies, such as the Federal Emergency Management Agency (FEMA) and the Department of Homeland Security (DHS), 43 academic institutions, and eight industry partners. Keynote Speaker Susan Coller Monarez, U.S. Deputy Assistant Secretary for Strategy and Analysis in DHS' Office of Policy, spoke about the importance of IC collaboration with the academic community, saying specifically that she appreciates academic engagement in conversations about homeland security and believes “we should never stop thinking about ways we can improve ourselves” (Keynote presentation, 10th Anniversary Homeland Defense & Security Education Summit, March 24, 2017). This book will also be of interest to academic scholars interested broadly in team science and interdisciplinary collaborations (see, for example, Aboelela, Merrill, Carley, and Larson 2007; Barbour and James 2015; Fiore 2008; Walker and Stohl 2012). Finally, members of the industrial sector who are interested in forming collaborative and engaged partnerships with government or academia should be interested in better understanding how to work collaboratively, and they would thus benefit from exposure to the comparison of various models of collaboration, as well as the description

of innovative team processes and outcomes featured in this book.

Organization of the Book

The book includes three parts. In Part I (Driving Motivations and Basic Frameworks), authors who were part of the original research team write about their experiences conducting research on and creating interventions to support immersive collaboration. Part I begins with a recounting of the motivation for the creation of LAS in Chapter One, “Innovating National Security through Immersive Collaboration: The Vision and Construction of the Laboratory for Analytic Sciences.” Drawing from interviews with NSA and NC State leaders and visionaries, Chapter One describes the IC environment that surrounded creation of the lab, logistical details, the partnership model, and the evolution of structures and protocols in the first years of the lab. Chapter Two, “Supporting Immersive Collaboration,” describes the administrative decision to create teams of facilitators, designers, and observers to support and study interdisciplinary communication and collaboration at LAS. The chapter is an overview of our team’s initial observations and conclusions regarding how structures support or impede collaboration. Chapter Three, “Member Perceptions of Collaboration,” presents a theoretical model of collaboration and the results of a longitudinal survey and focus-group interview with LAS members to examine member perceptions of the immersive collaboration at LAS. Chapter Four, “A Social Network Analysis of Collaboration at LAS,” describes a social network analysis of LAS relationships that reinforces the notions that networks expand over time, and that each team’s success is related to the role of the leader and their connection to others in the network.

Part II, Social and Technological Interventions for Collaboration, includes two chapters. Chapter Five, “Promoting Collaboration,” describes a variety of interventions designed to bring LAS participants together and enhance collaboration. Activities included expert-led seminars, a series of short- and longer-term workshops, development of an LAS lexicon, networking events, team health checks, and an annual symposium. The interventions are described to showcase their potential as well as demonstrate the benefits and limitations of each. In Chapter Six, “Supporting Collaboration and Discovery with Novel Computing Technologies,” we discuss a set of key LAS prototypes that are being developed to promote collaboration in future intelligence work.

Part III of the book (Chapters Seven-Thirteen) includes a series of case studies that describe the experiences of LAS personnel and partners as

they collaborated in specific research teams. Rather than merely arguing for the need for collaboration, these cases demonstrate real processes and pitfalls that collaborators experienced on their way to developing innovative research, products, solutions, and/or prototypes. Each case includes a description of how the team formed, the problem they intended to solve, team processes and pitfalls, what they learned about collaborative work, and how their output directly supported mission. The team projects described include “Anticipatory Thinking” (Amos-Binks, Browning, and Argenta—Chapter Seven), “Agent-based Modeling” (Artman, Li, Laber, and Johnston—Chapter Eight), “Learning from One Another” (Keyton, Jones, and Argenta—Chapter Nine), “Open Source Knowledge Enrichment” (Slankas—Chapter Ten), “Internet of Things” (Crawford, Kotlar, and Sherman—Chapter Eleven), “Analytic Rigor” (Tait, Vazquez, Tyler, Keyton, and Kampe—Chapter Twelve), and the “Technical Maturity Framework” (Kampe and Schmidt—Chapter Thirteen). Chapter Fourteen concludes the book with a synthesis of lessons learned from LAS and the implications for interdisciplinary and cross-sector collaboration within the U.S. intelligence community.

To mark important ideas for the reader, each chapter begins with a list of key terms and key points that carry practical implications for supporting or enacting immersive collaboration at program, group, and individual levels of analysis. In this way, we hope to make clear how readers can foster and implement collaboration, whether they are directing a cross-sector research lab, leading an interdisciplinary team, or participating as an individual in a collaboration. Figure 1.1 provides an example of how the key points at each level are highlighted throughout the chapters of this book. We hope that the LAS serves as an inspiration for other collaborative partnerships and helps participants navigate the challenges they entail in order to engage in continuous learning and realize the potential and promise of immersive collaboration.

KEY POINTS



Program: This refers to a method worked out in advance for achieving some objective. In the key points at the beginning of each chapter, we use the term *program* to refer to policies or procedures that apply to the entire Lab; we often refer to implications at the “the programmatic level,” such as communication, cultural alignment, and leadership.



Team: Throughout this book we use the term *team* to discuss any group of LAS members who work together to achieve a goal; we often refer to implications at “the team level,” such as meeting logistics and membership and team goals.



Individual: Throughout this book we use the term *individual* to refer to individual LAS members; we often refer to implications at “the individual level,” such as recruiting, onboarding, motivating, rewarding, and giving feedback.

Figure P.1: Description of “Key Points” visual for each chapter.

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PART ONE:

DRIVING MOTIVATIONS

AND BASIC FRAMEWORKS

1

INNOVATING NATIONAL SECURITY THROUGH IMMERSIVE COLLABORATION: THE VISION AND CONSTRUCTION OF THE LABORATORY FOR ANALYTIC SCIENCES

BEVERLY B. TYLER

LAS Brings together forward-looking academics and established industry, small business and start-up partners to collaborate hand-in-hand with the Intelligence Community and the Department of Defense mission partners, analysts, and researchers. Together, these teams envision, research, and create common analytic tools, tradecraft, and methodologies that further the art and science of analysis.

—Quoted from Invitation to 2016 LAS Symposium



CHAPTER 1

KEY TERMS

- **Collaboration:** communication and activities among interdependent parties that includes the sharing of information, resources, and ideas.
- **Delivery Order:** Also referred to as DO, is literally an order by LAS funders to deliver products within a set time frame. DOs are mostly annual, but several can run at the same time. Only academic and industry performers complete deliverables under DOs; however, LAS-G staff align their efforts with DOs to support immersive collaboration efforts. Throughout this book when we refer to a DO#, we are referencing the goals of or deliverables completed for that delivery order.
- **Immersive collaboration:** Immersive collaboration is a process through which cross-sectoral members share their disciplinary perspectives, cultures, methods and insights to create a shared, transdisciplinary approach to problem finding and definition, project planning, and solution development.
- **Interdisciplinary:** A mode of research that integrates concepts or theories, tools or techniques, information or data from different bodies of knowledge (Yegros-Yegros, Rafols, and D'Este 2015)
- **Operational Processes: (noun)**
a series of actions or operations conduced to an end; (verb) to subject to or handle through an established usually routine set of procedures. In this book, we use the term processes to refer to patterns that develop to achieve a goal that may become routinized, either at the individual, team, or program level.
- **Physical Structure:** Something arranged in a definite pattern of organization. Here we use the term physical structures to refer to organizational features that apply to LAS as a whole.
- **Translational:** The efforts of LAS are to translate basic science and research into practice through the development of methods and prototypes that address mission needs.

KEY POINTS



Program: The primary goal of LAS is to *reinvent the intelligence analysis process* in a way that leverages the expertise of academic and industry partners. LAS is expected to bring greater scientific rigor to analysis through academic and industry engagement, and generate innovative ideas for data analysis. It is believed that engagement with external partners can address several barriers to effective decision making, motivate consideration of alternative hypotheses, encourage proper sourcing and tradecraft, and potentially alleviate confirmation bias.

Careful partner selection is important to the success of any IC program collaborating with an academic institution. Universities may all be institutions of higher learning, but their histories, competencies, cultural values, visions, and leadership vary widely. When partnering for innovative solutions to security challenges, the IC must diligently assess the different institutions they could partner with and make a very complex multi-dimensional decision. Such financial commitments tend to be large and path dependent, so caution and care in deciding are imperative.

Decisions about the *contractual relationship* between the IC and an academic institution, as well as the *physical structure* and *operational processes* of the lab, are important, but they must also be malleable, so they can be revised over time. One reason for LAS success has been the willingness of leaders to learn what worked well and what needed to change from year to year; this has served to increase commitment to the lab and the concept of immersive collaboration.

Over the past 20 years, in response to changing technologies, data infrastructures, and emerging threats, the US National Security Agency (NSA) has experienced significant transformations in the methods needed to accomplish their mission for intelligence gathering and analyses. To address the challenges of the 21st century, the NSA has sought solutions through a number of investments designed to support their needs in the evolving intelligence landscape. Accordingly, the NSA theorized and proposed an innovative research and development (R&D) program that would connect, focus, and help coordinate government experts' participation with academic and industry experts: the Laboratory for Analytic Sciences (LAS).

LAS, also referred to here as "the Lab," is a partnership among the NSA and North Carolina State University (NC State) that brings together some of the brightest minds from government, academia, and industry to address the most challenging "big data" problems related to national security, and to promote new advances in the science of analysis. The purpose of this introductory chapter is to tell the story of the initial motivation to create the LAS, describe how the partnership between the NSA and NC State was formed, and recount the physical structures and operational processes that were created to realize the LAS vision. The goal is to provide practical information for those who might be involved in constructing a similar cross-sector, interdisciplinary lab, as well as supply important information about the LAS context.

For a comprehensive understanding of the partnership's formation, we have reconstructed the origins of LAS from a variety of sources: interviews with eight NSA and five NC State leaders involved in the initial planning and start-up of the Lab; the authors' experiences, observations, and analysis of LAS documents; and the insights of LAS members who have read and contributed to this chapter. Many of the interviewees also read our history and provided additional commentary or verification.¹ In sum, our method for constructing this history mirrors the LAS vision of cross-sector collaboration and offers rich, qualitative insight into the creation of the Lab.

¹ From November 2015 through March 2016, Dr. Beverly B. Tyler, with the assistance of colleagues, interviewed eight NSA personnel and five NC State administrators actively involved in the establishment of the LAS at NC State. The transcribed interviews form the foundation for this historical overview of the motivations, set-up, and early years at LAS. Although inconsistent understandings were at times reflected in the interview responses, Dr. Tyler acknowledges any potential mistakes in the overview as her own.

Creating the LAS: Motivations

Early motivations for the creation of LAS derive from the growing technological and personnel challenges that developed from the rise of the age of information and previous intelligence community (IC) programs that sought to leverage the knowledge of academics and industry. Because the job of the NSA is to collect timely information, embed it in the appropriate context, and transmit it to decision makers in a way that can be easily consumed and acted upon, many urgent questions had arisen: How can NSA better manage data? How do we sort through it? What should be labeled as “important data” coming out of this information? How do we understand it? How do we get the information that we need quickly and effectively? How, then, do our analysts communicate it effectively to the customers who most need it? How do we double the productivity of an individual analyst? As exemplified by these questions, the exponential rise in the amount of data increased the strain on analysts to perform an already very difficult job, and required researchers and designers to rethink the tools they were using and developing. NSA leaders recognized that re-engineering the analysis process would require not only a new, improved process and methodology, but a new venue for innovative research. The IC had experience with several previous programs designed to encourage cross-sector collaboration, and these models provided a blueprint for the vision of the LAS.

One model that has been in place for 50 years involves bringing NSA employees, government researchers, and academics together for 10 weeks each summer to focus on a few very important national security problems that tend to be mathematical in nature. The dynamic of cross-sector researchers working in a co-located space for an intensive period has been universally hailed as a stunning success that highly influenced the thinking of those involved in setting up the LAS.

Another initiative was designed as an outreach program to invite experts to examine analytical problems within the IC; introduce analysts to new tradecraft, technologies, and diverse thinking; and strengthen networks inside and outside intelligence. This model of collaboration was even more interdisciplinary than the program described above. It consisted of different kinds of government analysts, such as technologists, collectors, policy experts, and academics; and a broad set of industry partners, such as entrepreneurs, angel investors, medical doctors, film producers, and game developers. Inspired by the above model, participants in this new program were sequestered at a remote, off-site location for four weeks each summer to study, analyze, and assess a particularly thorny

national security problem, with as much of the work as possible being done at the unclassified level. The immersive nature of this program resulted in the development of strong, long-term, sustainable bonds among participants. Although this program has since been discontinued, former participants retain a cohesive community in which they collaborate and solve problems using the social network they developed during the program. Those setting up the LAS wanted to adopt lessons learned from this program as well.

LAS was envisioned to incorporate the best of these previous IC programs while making a sustainable commitment to immersive collaboration. The concept of *immersive collaboration* denotes a culture that goes beyond collaboration as coordination or cooperation to the idea of analysts and government researchers tackling problems “arm-in-arm” with academic and industry partners. At LAS, it is a process through which cross-sectoral members share their disciplinary perspectives, cultures, methods, and insights to create a shared, transdisciplinary approach to problem finding and definition, project planning, and solution development. This approach creates new knowledge and innovations informed by the interdisciplinary, multisector perspectives of the participants. In particular, interviews with the visionaries and first leaders of LAS revealed that the primary goal of LAS is to reinvent the intelligence analysis process in a way that leverages the expertise of academic and industry partners. LAS would bring greater scientific rigor to analysis through academic and industry engagement and generate innovative ideas for data analysis. Engagement with partners external to the IC could address several barriers to effective decision making, motivate consideration of alternative hypotheses, encourage proper sourcing and tradecraft, and potentially alleviate overall confirmation bias.

Finding the Venue: LAS and NC State

The initial conversation that sparked what would become LAS at NC State likely dates back to 2009, when Mike Wertheimer, Director of Research at NSA, paid a visit to SAS CEO Jim Goodnight in Cary, North Carolina. Wertheimer shared his vision of the formation of a NSA Laboratory: a hybrid of the best practices of the mathematics community at NSA and other IC programs. Goodnight then took Wertheimer to meet NC State Interim Chancellor James H. Woodward. Following that eventful meeting, NSA leadership began the two-year process of securing financial support, developing a budget, getting buy-in from faculty and industry partners, and exploring precisely what the Lab was going to do, where it