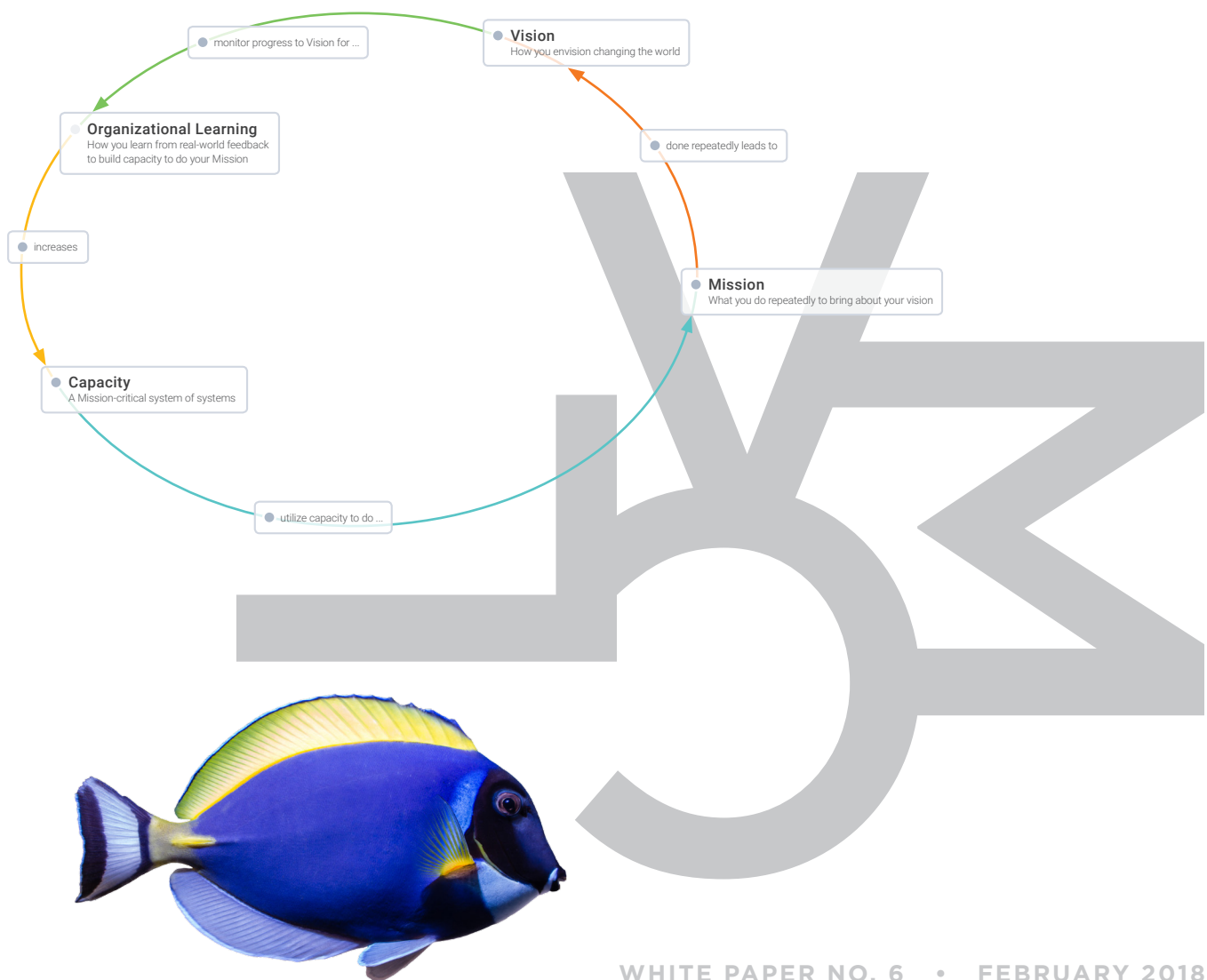
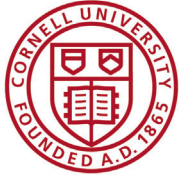


# SYSTEMS LEADERSHIP

Designing an Adaptive Organization Using Four  
Simple Rules to Thrive in a Complex World





Organizational design, change, and leadership in today's complex and uncertain environments can lead us to assume that complex problems require complex solutions. By identifying and leveraging the inherent functions of all natural systems, we can instead find simple solutions to solve complex problems. Once a professional mountain guide, Dr. Derek Cabrera went on to study cognitive science, evolutionary biology, and systems science. His research cuts through the complexity of organizational design, leadership, and change and systems thinking to provide organizational leaders with insight into the four simple, underlying functions that drive all organizations. Dr. Laura Cabrera, trained as a research translator, makes these powerful theories and formulas come to life in pragmatic tools, technologies, and frameworks that can be deployed for profound, immediate impact. This white paper offers a brief review of the Cabreras' work within systems thinking and systems leadership, the topic of their research and their semester-long courses at Cornell University.

### **SURVIVAL OF THE SUPERORGANISM**

We start organizations because we have a vision for the future that requires the work of other people to bring it to life. If you could accomplish your vision on your own, you would. Working with other people can be difficult and relies on patience and coordination with others. It requires intellect and emotional intelligence. The effort to accomplish a vision requires every member of an organization to work collectively and in concert. So how do we achieve that level of coordination? How do we design—or redesign—an organization capable of steering toward our vision while navigating the complexities of an uncertain world?

Nature provides our greatest insights into organizational design, change, and leadership around collective action. When we look to Nature, we see numerous examples where we “borrowed” characteristics of organisms to help with human endeavors:

- the stealth bomber's hawk-like profile;
- the invention of Velcro inspired by the seed dispersal mechanism seen in plants;

- the creation of impervious epoxies based on the adhesion of barnacles; and
- the innovation in air conditioning systems in high rise buildings that are modeled after termite towers.

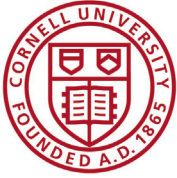
There is a long tradition of biomimicry (looking for insights in Nature) to inspire human success. We can extrapolate from the behavior of beehives, ant colonies, schools of fish, and numerous other complex adaptive systems. How do these individual creatures self-organize? How do they coordinate their collective action? It turns out that these natural systems are so successful because the individuals follow simple rules.

### **Collective Intelligence**

Ant colonies are comprised of a group of ants that each possess only a single-neuron brain. Yet, as a collective, they appear quite intelligent. How is this so? Did all the ants graduate from an ant training school to make them smarter than their limited brain would suggest? Sadly, each ant individually will always be not-so-smart. So how is that they appear to be smart as a collective? The answer lies in the simple rules they each follow to survive; as a pattern for collecting food. *Importantly, it is the simple rules, followed collectively, that makes them a success, and ensures their survival.*

### **Simple Rules**

Here's how they do it. If there are three piles of food in varied distances from an ant hill and watch what happens as the individual ants leave to collect food, you will see that the closest pile of food is collected and delivered to the colony first. The second closest pile of food is collected, carried, and delivered next, and the furthest pile is last. This collective action is intelligent, and it's carried out in a concerted pattern that is very smart. It is efficient in getting the maximum sustenance to the colony at the minimum risk of predation to each ant. This series of intelligent behaviors are the result of three simple rules each individual ant follows; (1) look for food; (2) if you find food, shoot pheromones to mark your path; and (3) never cross a pheromone trail. The simplicity of these rules, at first glance, don't scream intelligence. But when followed collectively, by all the ants, the emergent



property is a coordinated, rehearsed set of actions that result in accomplishing their fundamental vision—to survive and thrive.

calls the study of complex adaptive systems “plectics” (the etymology of which is rooted in the terms *simplex and complex*) because he says that to understand complex

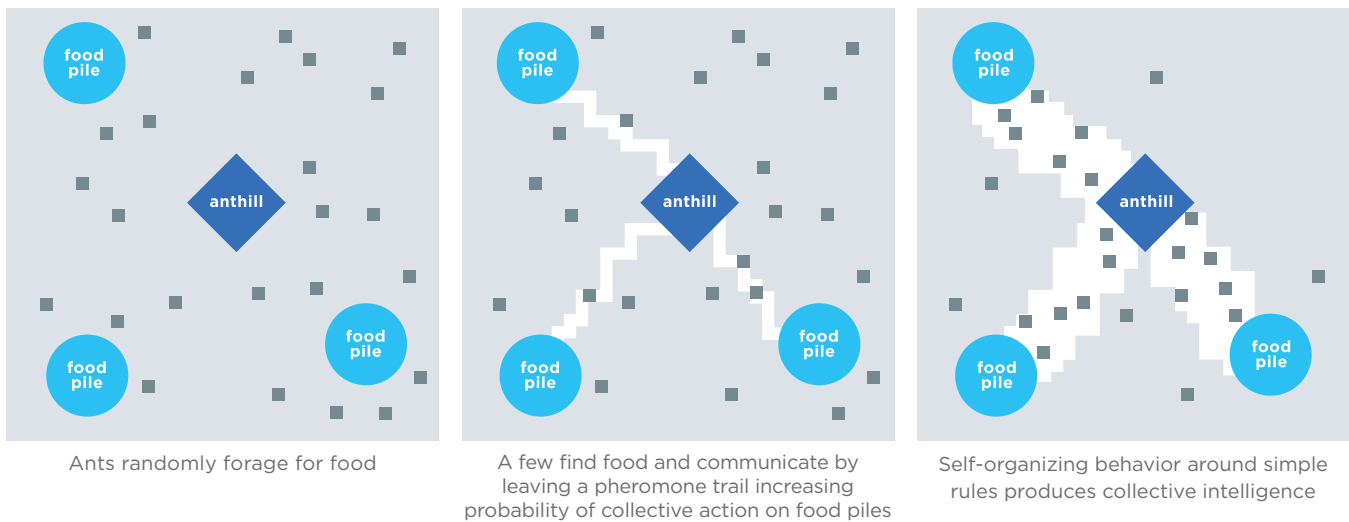


Figure 1: “Heat map” of ant collective intelligence based on simple rules

## The Superorganism

These ants are a superorganism—a bunch of independent organisms acting like a single organism. Superorganisms transform self-interested, autonomous agents into an adaptive, intelligent collective that is far more capable as a unit than as individual actors. Remarkably, this phenomenon of a superorganism frequently occurs without a leader screaming instructions from a megaphone to shape this behavior.

Your organization can be more like a superorganism under your leadership. Leveraging the simple rules of organizations can create an ability to adapt quickly to the changing environment, be resilient in adversity, and attract human talent. The problem is, we distrust simplicity. We believe that our complex problems require complex solutions. When we see that simplicity underlies complexity, we can solve wicked problems.

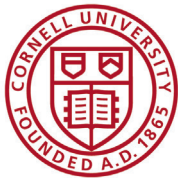
A key lesson from nature is that your organization is a *complex adaptive system*. The degree to which you lead and manage it as such will largely determine its success or failure. Murray Gell-Mann, Nobel Laureate in Physics

systems it is important to “connect with both simplicity and complexity.”

### ALL ORGANIZATIONS ARE COMPLEX ADAPTIVE SYSTEMS

All organizations are complex adaptive systems because they are made up of individuals (agents) collectively working towards a common vision. As a leader, you can embrace this reality and leverage it to your advantage. As complex adaptive systems, all organizations have the ability to learn and adapt from the feedback that learning provides. The job of leadership is to create an organization that learns how to *survive* and *thrive* through adaptation to real-world feedback. Capturing and communicating organizational learning that is focused on improving capacity to achieve organizational goals requires systems to ensure that individual learning is disseminated throughout the organization.

Seeing your organization as a complex adaptive system means that leadership influences the emergent properties of a system by shaping the simple rules agents follow. A leader must (1) select agents (through recruiting,



retaining, and training) and (2) ensure enculturation of simple rules for the organization. The simple rules of an organization can be leveraged to maximize organizational learning, adaptation, and success. The simple rules of all organizations are vision, mission, capacity, and learning (VMCL). VMCL provides the formula to design, lead and manage a “complex adaptive organization” (CAO).

### VISION, MISSION, CAPACITY, LEARNING (VMCL)

Consider the word organization as a *verb*—the act of organizing, the way things are organized. All organization, ranging from *organisms*, to organs, to colonies, flocks, tribes, cities, countries and even societies share four fundamental functions in order to survive. The degree to which they focus and enhance these functions will determine if they thrive.

1. a goal state (**VISION**);
2. things they need to do towards a goal or end state, or daily work (**MISSION**);
3. systems that build ability to do their work (**CAPACITY**); and
4. feedback provided from their environment (**LEARNING**).

VMCL is a systems leadership and organizational model that helps design, guide, manage, and change organizations. The terms vision, mission, capacity, and learning are based on a mathematical formalism that articulates how organizations work as complex adaptive systems. Specific litmus tests for each function lead to the creation of a vision and mission that is coupled, and organizational capacity that is created by organizational learning.

The work we do with organizations encapsulates two semester-long courses on systems thinking and systems leadership. Here are a few things to focus on when thinking about organizational design, change, and leadership.

### Learn to Think, Think to Learn

In organizations, individual employees must think and rethink various systems in order to constantly improve them. Thus, it is “systems thinking” that drives organizational learning. Experts in systems thinking, the Cabrerias have revolutionized the field since the 1990s with the discovery of underlying cognitive skills that are universal to all systems thinking frameworks. These underlying skills are: making distinctions, organizing part-whole systems, recognizing relationships, and taking perspectives (DSRP). The Cabrerias have not only been research leaders in the field but have also dedicated their Lab to developing new tools and technology to aid in systems thinking.

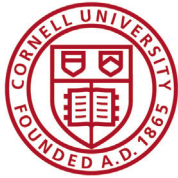


Figure 2: Systems Thinking

### Organizational Learning Is How You Survive—and Thrive

Let’s say you are leading an expedition to climb a big high-altitude mountain. During a climbing expedition, you need to constantly adapt to survive. You can’t just arrive with a plan and assume things are going to work out according to that plan. In mountaineering they say, “Life is what happens when you are making other plans.” In business the same is true, the best laid plans are confronted with reality. Adaptability becomes necessary. Adaptability is caused by learning.

To build the right kind of learning organization, oriented to the North Star of your Vision, we first need to take a hard look at Learning. How people think, how we learn, and what we do with the feedback we receive from the world around us are absolutely foundational to the success of any organization.



Learning—whether it is at the individual or organizational level—is about adapting to changing circumstances. Simply put, the more you develop individual employees as systems thinkers and build a culture that supports organizational learning, the more adaptive you will be.



Figure 3: Learning

All organisms and organizations need to learn in order to survive and thrive. Learning makes it possible for organizations to process the feedback they get from the environment and adapt. And it starts with training your people to think and model systems. All organizational learning should focus on increasing your capacity to do Mission.

### Constantly Learn New Ways to Increase Capacity to Do Mission

During a climbing expedition, you need a tremendous amount of capacity. These capacities exist in systems like food, clothing, and shelter (gear, oxygen, medicine, etc) but these systems serve one mission-critical purpose: to provide you with the energy to take another step up the mountain. So organizational capacity is, if it's done right, a bit like a storage of energy to do the Mission. Unfortunately, it is often not done right.

Increasing capacity means building a system of mission-critical systems—systems that support the Mission of the organization. As we receive feedback from many sources, we must attend to it in hopes of increasing our Capacity to do our daily work (Mission). In other words, if our efforts are not directly tied to organizational mission, they are likely a waste of human and other resources.

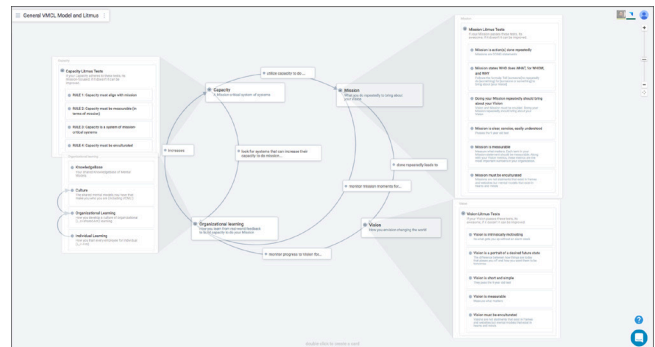


Figure 4: Capacity

In organizations there are many systems. We help organizations map these systems based on function and measured by impact on mission. We do this by helping them to build an evolving atlas of interrelated maps which depict the results of the learning—and the learning itself is visible through the evolution of the atlas. This atlas is in turn used daily as new learning improves capital systems. This evolving atlas is also indispensable as an onboarding tool for new employees and employee training in general. We also work with organizations to develop a shared map of the entire organization using Plectica modeling software. This map provides a portal into an interconnected knowledgebase (atlas).

### Doing the Mission Repeatedly Brings About the Vision

In our research and practice we've found that there is a costly conflation of Vision and Mission and a lot of misunderstanding around what makes them different and why it is so important to have both. Our Vision is a future goal state we hope to reach, much like the summit of a mountain. But to reach the summit, we need to put in the daily work—or Mission. The mountaineer's mission is always to “take one step, repeat” until they reach the top. An organizational leader much show their team where the summit is—or help them to see the vision—and then ensure that the mission of the organization is an articulation of what must be done daily to reach that Vision. The Vision is the summit. The Mission is the repeated taking of steps to get there.



Figure 5: Vision-Mission

We use litmus tests with teams to ensure first that they create a simple, clear and measurable Vision-Mission. This process and the result are nothing like what you may be used to. Most Visions and Missions do not exceed two or three words and each term is measurable. They have a formal purpose and a defined formula.

### Enculturating VMCL

Once organizational leaders have developed a clear, concise, and measurable Vision-Mission, initially mapped out their capacital systems, and set out a plan for organizational learning, the real work begins: enculturating these ideas and tools so that they are shared across the organization.

We often work with CEO's and executives who aren't initially pleased when we tell them that a long-winded Vision or Mission statement in a wall frame or on a website isn't the same as having a Vision-Mission. Vision and Mission are not statements or platitudes, they are deeply understood and meaningful mental models shared by everyone in the organization. It is the leader's job to "walk around" and connect people's daily work to the metrics and meaning of the Vision-Mission and to encourage through various methods and means the constant improvement of mission-critical capacital systems based on new learning.

### FIND YOUR SIMPLE RULES

Leaders are often working harder than they need to. As the world and business environment gets more complex, leaders tend to want to plan, command, control and utilize more. But precisely the opposite is needed. Recognizing the fundamental and natural characteristics of successful organizations (VMCL) allows for the discovery of simple solutions to complex problems in an even-more complicated environment. Create an organization that has a crystal clear and measurable Vision-Mission. Allow your talent to self-organize around those ideas to Learn what needs to be learned. Build the Capacity to do the Mission and bring about the Vision.

Simple Rule	Function
Vision (V)	Desired future state or goal
Mission (M)	Action(s) that in repetition bring about the vision
Capacity (C)	Systems that provide readiness to execute mission
Learning (L)	Continuous modification of mental models from external feedback

Table 1: VMCL Simple Rules/Organizational Functions

### FROM CORNELL TO CORPORATE

Derek and Laura teach two 16 week graduate courses in Systems Thinking and Systems Leadership. Their executive education programs bring the best of these courses to organizations. The following table describes some of the ways they can engage to help you leverage systems thinking in your organization. Through keynote talks to leadership, trainings, webinars, an online MOOC training, individual scoring on the systems thinking and meta-cognitive inventory (STMI), and application of a systems modeling software, Derek and Laura provide systems thinking skills (DSRP) to organizations and apply it to customized content. For organizational learning to take place, individual learning must be encouraged. Individual learning requires an awareness of how one thinks, and tools to help model thinking. Systems thinking.





Training & Tools	Offerings & Engagements
Keynote Address	Sound the keynote for an initiative and get everyone on the same page (1-2 hour dynamic and insightful talks).
Systems Thinking Training	Get executives & key personnel trained in systems thinking (DSRP) & modeling. Can be offered as full days; half days; ongoing cohorts; or, offsites in Ithaca, New York.
Systems Leadership Training	Get executives & key personnel trained in systems leadership (VMCL) & modeling. Can be offered as full days; half days; ongoing cohorts; or, offsites in Ithaca, New York.
VMCL Consulting	Develop systems leaders & design an adaptive organization; create a clear measurable vision, mission, cultural & capacital systems, & learning metrics.
Online Training (MOOC)	Create systems thinkers at all levels within your organization at a scaleable price point.
Ongoing Webinar Series	Achieve customization & scale through a live webinar series for continuous learning; can be offered in cohorts or as a small group support, as needed.
Systems Thinking & Metacognitive Inventory (STMI)	An edumetric baseline measure of participants' system thinking skills & abilities in four critical & foundational domains; engages & motivates them to increase their score through ongoing training.
Books & publications, prework & media, posters, & videos	Provide training participants with a tangible take away for immediate implementation of systems concepts in their daily work, and to support systems thinking initiatives in organizations.
Systems Modeling Software	Enables employees to model any system for deeper understanding, & analyze complex problems to meet complex organizational challenges & develop potential solutions.

Table 2: Popular Systems Thinking Engagements

