Meeting Reports

Gordon Research Conference on Predator–Prey Interactions: From Genes, to Ecosystems to Human Mental Health

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This inaugural Gordon Research Conference took place 5–10 January 2014, at Ventura California, and was supported by grants from the GRC Organization, National Science Foundation (USA), The University of Western Ontario (CAN), Environment Canada, and The Pacific Wildlife Foundation (CAN). More information on this conference can be found at www.grc.org/programs.aspx?year=2014&program=predator, and information for the next conference in 2016 at www.grc.org/. The idea for this conference series was created by Liana Zanette, Evan Preisser (Rhode Island University), and Michael Clinchy (University of Victoria). In addition to those already mentioned, the program benefited from input by Scott Creel (University of Montana), Oswald Schmidtz (Yale University), and Jay Schulkin (Georgetown University).

Predator–prey interactions have shaped all life on earth, and it is this underlying commonality that helps explain the development of so many parallel, but as yet, independent research paths across diverse fields from genetics, neuroscience, physiology, developmental biology, and human psychology, to ecology and evolutionary biology. The result is that publications involving predator–prey interactions were featured in over 4000 papers in 2013 alone, with hundreds of presentations at numerous meetings and symposia. While progress within each field is clearly being made, such an enormous body of research conducted at all levels of biological organization holds the promise that a truly transformative understanding of predator–prey interactions could be attained, save for the lack of a forum that can coalesce these parallel research paths. This new Gordon Research Conference series brings the leading investigators from diverse fields together, all in one place, and gives them ample opportunity to discuss how each addresses facets of the same phenomenon, to explore the unique insights to be gained from an interdisciplinary focus on predator–prey interactions.

Because this topic is immense, a new subtheme will be developed every two years, each with a different flavor and set of barriers to break. The inaugural conference focused on predation risk (i.e., predator-induced fear) as the underlying thread that binds together seemingly disparate fields ranging from neuroscience to ecosystem functioning to human mental health. Predator-induced stress is a hallmark of predator–prey interactions that is unlike any other stressor that animals face, because the consequence of failing to avoid a predator leads to death and so is definitive, unforgiving, and irreversible. Such a strong evolutionary force has left its imprint on all animal life, and it is these commonalities that were the basis of the nine session topics and 24 presentations summarized below. Each session of this conference was introduced by a leader in the field who then engaged the audience in discussion after each talk. Our Discussion Leaders were Larry Dill (Simon Fraser University), Phillip Zoladz (Ohio Northern University), Peter Eklöv (Uppsala University), Jay Schulkin (Georgetown University), Ken Lukowiak (University of Calgary), Maria Thaker (Indian Institute of Science), Evan Preisser (University of Rhode Island), James Estes (University of California, Santa Cruz), and Andrew Beckerman (University of Sheffield).

In addition to promoting the cross-fertilization of ideas using the talks as a foundation, another key objective of this conference was to build a collegial, cohesive, dedicated, multidisciplinary, global network of researchers interested in predator–prey interactions, who will discuss and collaborate with one another long after each conference is over and who will come back to participate in this conference series time and again. Participants represented 16 different countries and included a mix of professors, nurses, students and postdoctoral fellows in addition to research scientists and directors from universities, governments, and nongovernmental organizations. The key to community building was to ensure that all attendees were engaged throughout the conference, such that all members of the group were active participants rather than passive attendees. We all met at the same time and place to listen to each talk, allowing us to concentrate on the same set of issues and add our voice at each discussion. To give everybody the opportunity to highlight their own most exciting research and to facilitate new collaborations and research synergies, we encouraged all attendees (senior and junior participants alike) to present a poster. The response was overwhelming, and the result was that 88% of those in attendance were presenters as well. Each day, there was also ample time for informal discussion. We were all at the same venue, and testimonials described the discussions at mealtimes as some of the best they have ever had. Each day, the Chair would ask the audience for three challenging predator–prey topics for impromptu break-out groups held during our daily four-hour afternoon break. These were very popular, as they were completely discussion-oriented and grass roots and provided a further catalyst for interdisciplinary interactions.

The first formal session of the conference, entitled “Establishing an Interdisciplinary Approach to Predator–Prey Interactions,” was designed to set the tone for the rest of the week and to begin the process of understanding each other’s perspectives. To that end, it featured scientific presentations from the ecology and cognitive neuroscience points of view. Oswald Schmidt (Yale University) described his vision “Toward a cohesive, holistic view of predator–prey interactions,” emphasizing the importance of a reductionist approach in understanding ecosystem functioning. As an example of this all-inclusive method, he outlined how the evolutionary ecology trade-offs that all species face can be used to help explain the emergent properties that control ecosystems, and that such trade-offs start with neurosensory processing and stress physiology. David Diamond (University of South Florida) then described how predator–prey interactions serve as a template for understanding traumatic memory formation such as those experienced by sufferers of post-traumatic stress disorder (PTSD), thereby describing how the larger, more holistic view can inform a more reductionist one. In his talk "Understanding predator–prey dynamics provides insight into the adaptive and maladaptive features of the biology of PTSD," Diamond demonstrated how the adaptive response to threat can transform the brain leading to long-lasting consequences on both physiology and behavior.

All animals, at least at times, experience fear, and not surprisingly the neural circuitry underlying fear is highly conserved across species. Just as fear can be measured in the brain, so too can it be measured by an animal's behavioral response to predators and predator cues. Indeed, neural activity in the brain will be manifested in an animal's behavior, while the animal's behavior can also help us pinpoint the areas of brain driving such responses. The interplay between "The Neurobiology of Predator-Induced Fear" and its behavioral consequences was the subject of the next session. Joel Brown (University of Illinois-Chicago) described what has come to be known as the "Ecology of fear: using behavioral titrations to measure fearfulness and its consequences". Brown convincingly demonstrated that the degree to which an animal is fearful can be measured by its foraging intensity within a patch and across a landscape, because prey will forgo food to avoid becoming food. As the next three speakers revealed, such behavioral responses are an integral part of measuring the neurobiology of fear in rodent studies in the laboratory. Newton Canteras (University of Sao Paulo, "What ethologically based models have taught us about the neural systems underlying fear and anxiety") demonstrated that fear memories and fear behavioral responses are encoded in different parts of the brain. This has led to the amazing discovery that while the neurological assessment of a fearful stimulus can be maintained in one part of the brain, the associated antipredator behavioral response of a fearful animal can nonetheless be eliminated through lesioning another. Picking up on this theme, Jeffrey Rosen (University of Delaware) highlighted the critical role that predator cues play in eliciting fear memories and anti-predator responses. In "The smell of fear: innate fear of predator odor," Rosen described how predator odor is a powerful fear inducer that does not need to be learned, yet generates classic antipredator behaviors such as freezing. Another important aspect of fear memories is that animals will develop a suite of additional memories that are associated with the life-threatening event. PTSD, for example, is sometimes considered a disorder of memory whereby even innocuous cues that were simply present at the time of the trauma are learned, and can subsequently trigger intrusive memories of the event. Jacqueline Blundell (Memorial University, "Neural mechanisms underlying predator stress-induced fear memories") focused on how these associative fear memories are formed, how their formation can be blocked, and critically, Blundell showed that such memories, or at least the physiological and behavioral responses to them, can be extinguished.

To further close the gap between neuroscientists and ecologists, the follow-up session centered on the theme of "Inducible Morphological Defenses." Just as predator cues can produce lasting effects on the neural circuitry and brain function in "higher" vertebrates, so too are there lasting predator-induced effects on the neurophysiology in amphibians and invertebrates, who also show an amazing array of changes in general morphology. For example, chemical and other cues signifying the presence of a predator can lead to alterations in body shape and size that aid in escape, in addition to the development of body armature (e.g., spines) and chemical defenses. Taken together, one could consider changes in brain tissue in response to predation-risk to be simply another inducible morphological defense. In his talk "Inducible antipredator defenses and the phylogeny of fear: insights from the world of amphibians," Rick Reylea (University of Pittsburgh) showed that exposure to predator cues (i.e., odor) alters the shape of the amphibian brain. Reylea then examined the phylogenetic patterns of a variety of inducible morphological defenses across 23 amphibian species. He reported that while many of the traits themselves carry a phylogenetic signal indicating that they are constrained in their evolution for any given species, the plasticity of these traits is not constrained. Ralph Tollrian (Ruhr University) then described his elegant experiments designed to unravel "The genetics and neurophysiology of inducible defenses in Daphnia". Tollrian revealed that the fear pathway for these invertebrates starts with a predator cue (pheromones/odor), which leads to an increase in neurotransmitters that are the catalyst that kick-start a variety of genetically coupled morphological defenses.

Though we tend to think of predator–prey interactions as pertaining to other species more than humans, there is increasing recognition that many aspects of the human condition have been shaped by our evolutionary history as both predators and prey. Physiologists have increasingly begun to consider that this critical need to escape from predators explains why the core of the stress response is built around the rapid mobilization of energy to one's muscles. Predators also provoke powerful emotional responses, making them ideal stressors for use in animal studies on the etiology and treatment of human anxiety and stress disorders. As a result, predator presentation has become one of the principal stressors used in studies of the animal model of post-traumatic stress disorder (PTSD). One of the hallmarks of PTSD is the transformational change in patients that can result from even a single traumatic event. Neuroscientists, in turn, have begun documenting that even a single exposure to a predator can induce just such a transformational change in brain function, prompting some psychiatrists to begin discussing the "evolution of PTSD" (Silove 1998 *Psychiatry* 61:181–190) as a response to predators. Similarly, developmental biologists are now exploring if the reason why maternal stress in humans often induces anxiety disorders in children is because, evolutionarily, mothers living in stressful environments full of predators could provide an adaptive benefit to their offspring by "programming" them to be especially anxious and vigilant. These ideas were discussed by two wildlife ecologists and two researchers investigating human mental health in the session on "Predators as Stressors: Integrating Human and Animal Models."

In his talk, "Fear in free-living wildlife and human mental health?" Michael Clinchy (University of Victoria) provided an integrative viewpoint and explained how studying predator-induced fear in free-living wild animals can enhance our understanding of human mental health. Animals in the wild are relentlessly exposed to life-threatening events, and it is precisely this threat of immediate violent death that is the link to human mental health research. Clinchy provided evidence that such exposure can have transformational effects on the brains of wild animals, in addition to their physiology and behavior, and that such effects translate into significant reductions in the number of offspring wild animals can produce. Because these responses are meant to keep you alive, they cannot be considered maladaptive. Viewing the transformational effects of fear as a natural mechanism for survival, rather than a maladaptation, may help reduce the stigma associated with human mental health disorders such as PTSD, and aid in cognitive therapies. Sophia Lavergne and Rudy Boonstra (University of Toronto, Scarborough, “The snowshoe hare cycle and the role of fluctuating predation risk”) added another component to this by reporting that pregnant, wild snowshoe hares are extremely sensitive to predation risk and will fail to produce young when predation risk is naturally high or elevated with a manipulation. Offspring that are born to mothers “stressed” under high predation risk are themselves more stressed, and the speakers have evidence that epigenetic programming of the hypothalamic-pituitary-adrenal axis may be a key driver in this inheritance from mothers to young. In her talk, “Maternal stress during pregnancy predicts cognitive and behavioral changes in the human child, including increased fearfulness,” Vivette Glover (Imperial College London) picked up on this theme from the human point of view. Glover explained that it is well established in animal models, and increasingly in humans, that stress experienced by mothers during pregnancy has a causal effect on the neurodevelopment and subsequent behavior of their offspring. Here, placental changes caused by stress appear to be one of the driving forces. Glover ended by suggesting that such changes could be considered an evolutionary adaptation to predator-induced stress because these children often exhibit behaviors that could be considered beneficial to warding off a predator attack. Such behaviors include increased vigilance, for example, which today is considered Attention Deficit Hyperactivity Disorder. Rachel Yehuda (Mount Sinai School of Medicine) ended the session by focusing on PTSD. In “Protective and damaging effects of the bio-behavioral stress response: cognitive and clinical aspects,” Yehuda explained that PTSD was first described in 1980 with the recognition that humans too can suffer a chronic stress response after experiencing a traumatic, often life-threatening, event. Yehuda described how associative learning will frequently trigger intrusive memories of the event which sparks an emotional feeling of fear accompanied by all of its physiological manifestations (e.g., increased heart rate, etc.). While the existence of PTSD and the reasons for its etiology in PTSD patients are evident, curiously, the majority of those that experience a traumatic event do not develop PTSD, and Yehuda is examining reasons for this variation in susceptibility which could be of immense clinical value.

Throughout the conference, we had been learning about the importance of forming fear memories. Because failing to associate predator cues with danger will undoubtedly lead to death, learning and memory are absolutely fundamental for all animal life. At the same time, learning and memory can be costly if the cue that is learned is irrelevant to predator risk, or the risk no longer exists. This has led to much new research on “adaptive forgetting.” In the session “Learning, Unlearning and Communicating Fear,” participants explored the cognitive rules involved in deciding what is fearful and when to be fearful, and how fear of predators governs the intra- and inter-specific communication of fear. Maud Ferrari (University of Saskatchewan) provided empirical results that clearly revealed “The role of uncertainty in learning and retention of predator information.” Her manipulations on aquatic species show that antipredator responses are retained and exhibited over a long time period, but only when the prey are certain that a predator cue represents substantial risk. When certainty is reduced, the prey abandon the behavior relatively quickly. Ferrari then asked, “What happens to that memory? Do the prey just forget?” On the contrary, she reports that the memory is simply ignored in situations where the level of risk is low, but sets off antipredator responses again under heightened risk. Therefore, prey continuously update information about the risk level posed by predators and display adaptive threat-sensitive antipredator responses. Examining the loss of fear at an evolutionary scale, Dan Blumstein (University of California, Los Angeles) examined "Predator naiveté: when and how do prey lose their fear of predators?" If fear responses are costly, then prey should lose it if they do not use it. Indeed, some prey species are famously known to be naïve to predators and their cues. Darwin wrote about the tameness (i.e., fearlessness) of animals on isolated and predator-free islands, which is just one example of many. While some animals clearly are naïve to predators and their cues, many others do not lose their fear, even when a predator(s) has been lost from the system, and Blumstein described the current thinking regarding the evolution of predator naiveté. Thus far, all talks in the conference had focused on the presence of the predator or their cues as the stimuli required to generate fear. Intriguingly, Robert Magrath (Australian National University) in "Signals of danger: how and why to eavesdrop on the neighbors," revealed the importance of cues one step removed from those emitted by the predator, and that the processing and communication of fear from one prey species can be learned and used by other species in the prey community. Using elegant manipulations, Magrath showed that an avian species can learn the alarm calls of others, and by learning to do so, benefit by responding with antipredator defenses. Just as different prey species may "eavesdrop" on each other to gain information regarding the presence of a predator, so too may the predator eavesdrop on communication among the prey. In his fascinating talk, "Dangerous liaisons: the predation risks of receiving social signals," Peter Banks (University of Sydney) described how mammalian prey (e.g., mice) dispense and use odor to "speak" to one another and assess the degree of conspecific competition. However, because the smell of prey is also used by the predator as a homing beacon, prey will actually modify their communication with conspecifics when predation risk is high, in order not to be "overheard."

This new Gordon Research Conference series on Predator–Prey Interactions is occurring at a critical time, coincident with what a recent review in *Science* (Estes et al. 2011, 333:301), co-authored by 24 of the world's leading ecologists, called a "paradigm shift in ecology." This shift is derived from the recognition that predators play a preeminent role in affecting "processes as diverse as the dynamics of disease, wildfire, carbon sequestration, invasive species, and biogeochemical cycles." Research on the ecology of predator–prey interactions is currently being transformed by the recognition that the neurological, physiological, developmental, genetic, and behavioral effects that predators have on individual prey may in most cases be more important to populations, ecosystems, and conservation than the sum of the number of prey directly killed by predators. In the session, "Fear Effects on Population- and Ecosystem-Level Processes," Scott Creel (Montana State University) explored "The role of predation risk in mediating the predator–prey dynamics of large carnivores and their ungulate prey". Wolves have recently been re-introduced and have recolonized parts of Yellowstone National Park. Taking advantage of this, Creel paired six elk herds that overlap with wolves with six that do not. Using a variety of field techniques, Creel presented evidence that elk increase antipredator behaviors such as vigilance when there is a chance of encountering wolves. Such changes in antipredator behavior are the start of a pathway that leads to reductions in food acquisition which are severe enough to negatively affect the pregnancy rate, and hence, calf recruitment, which is one of the principal drivers of elk population dynamics. Creel concluded that these individual-level responses to predators are the principal reason why elk population numbers have declined post-reintroduction, with direct killing accounting for a smaller fraction of the variation. That such individual level responses can have ecological effects at larger scales was furthered by Dror Hawlena (Hebrew University) in his talk "Fear of predation affects ecosystem elemental cycling." In a series of clever experiments, Hawlena showed that when spiders have their mouthparts glued shut so that they can intimidate but not kill prey (i.e., grasshoppers), prey respond by increasing their metabolic rate. To meet this heightened energy demand, grasshoppers change their diet from preferred, protein-rich plants that foster growth and reproduction, to less preferred but energy-rich plants that can fuel activities such as escape behavior. The ensuing change in the chemical composition of their bodies leaves its trace in the chemical composition of the soil, which was rendered poorer in quality. Therefore, terrestrial predators are able to regulate ecosystem processes by affecting the antipredator physiology and behavior of individual prey.

Predators, of course, kill prey, and the removal of individuals from the prey population is traditionally thought to be the only way that predators can affect their numbers. That predators keep prey numbers in check is also the traditional explanation for why herbivores do not overgraze the plants they eat. Throughout the conference, we have come to understand the impact that predator-induced fear has on animals. It follows, then, that where predation risk is high, there ought to be more of the food that prey eat, because the prey are too frightened to eat it. Hence the question posed in the session "Does Fear Make the World Green?" In answering this question, Pamela Reynolds (University of California, Davis) emphasized that although fear effects can potentially cascade down to influence lower trophic levels, these behavioral cascades do not always occur. In her talk, "Factors influencing the strength of fear effects in aquatic food webs," Reynolds provided evidence that the strength of behaviorally mediated trophic cascades are magnified when there are multiple predators in the system, while single predators (even when at the same density as multiple ones) weaken them. In North America, one of the highest-profile wildlife conservation issues is the reintroduction of wolves to Yellowstone National Park (1995, 1996). A tremendous amount of controversy exists as to whether the presence of wolves has led to a reduction in elk population numbers extreme enough to cause a trophic cascade, whereby predators have a positive effect on the primary producer because of their negative effects on its herbivore prey. This, and other issues, have all led to a raging public policy debate that questions the impact that predators actually have on wildlife populations. In fact, the exchange is often so acrimonious that National Geographic (March 2010) has termed it the "Wolf Wars." In examining this controversy, Mark Boyce (University of Alberta) made several important points. Boyce asked, "Does fear of large carnivores reduce the impacts of ungulates on the plants ungulates eat?" and concluded that the answer appears to be "yes" on average, but the effects are highly variable across the landscape, which is one reason no consistent answer exists. Boyce nicely put each component of the chain into its logical context. There is no controversy that elk heavily browse willow, and a high degree of browse reduces not only current primary productivity, but depresses future growth as well. Therefore, herbivores have the capacity to make the world green. Using dendrochronology, Boyce demonstrated that willow stems, on average, have been escaping browse post- as compared to pre-wolf reintroduction, but again, enormous variation exists amongst sites. It cannot be disputed that wolves eat elk, and that elk numbers have been declining post-reintroduction. Moreover, elk do shy away from areas that have or are likely to harbor wolves, suggesting that fear may play a role in mediating this trophic cascade. Notwithstanding, the variation among sites in browsing pressure remains perplexing, and this, in conjunction with Reynolds highlighted that the question initially posed by the session "Does Fear Make the World Green?" should really be rephrased to "Why Does Fear Not Always Make the World Green?"

Part of the "paradigm shift in ecology" that is occurring stems from the knowledge that the loss of apex predators "may be humankind's most pervasive influence on nature" (Estes et al. *Science* 2011, 333:301). We have learned that predators effect massive changes on individual prey with far-reaching effects on prey populations and entire ecosystems. Around the globe, the human extirpation of top predators constitutes a replicated "experiment" undertaken in marine, terrestrial, and freshwater systems, all corroborating that disrupting predator–prey interactions has diverse and unanticipated impacts. Bodil Elmhagen (Stockholm University) opened the session by talking about the effects that carnivores have on each other. In "Top predators, mesopredators and their prey," Elmhagen showed that, according to the historical records in Fennoscandia, the loss of top carnivores (wolves, lynx, bears, wolverines) 100 years ago led to the release of the red fox, a mesopredator. At the same time, overhunting of the Arctic fox caused their near demise. Though protected since 1928, Arctic foxes have exhibited little recovery and Elmhagen points to competition with the now numerous red fox as a critical reason why. The recolonization of lynx to Finland has subsequently led to a suppression of red fox numbers to the benefit of many other species, including their prey. Returning to marine systems, Mike Heithaus (Florida International University) described the "Ecological consequences of marine top predator declines." In an impressive array of natural experiments coupled with manipulations, Heithaus showed that in the relatively pristine ecosystem of Shark Bay, Australia, tiger sharks significantly alter the foraging behavior of both dolphins and dugongs with cascading effects on plant primary productivity. The implications are that marine ecosystems around the world are suffering from the loss and reduction of top marine predators. In a very moving talk, Craig Packer (University of Minnesota) spoke about "Large carnivore conservation: is the solution fenced reserves?" Lions are scary animals for humans. Not only do they kill large ungulates, including our livestock, they kill us as well. Indeed, lions hunt mostly at night, which Packer suggests may help explain, in evolutionary terms, our innate fear of darkness. However, in recent decades, most human deaths from lions occur where their native herbivore prey are no longer abundant, and humans are out, often at night, to guard their crops and livestock. Killing lions to retaliate against human or livestock death is commonplace, occurring even within the confines of a "protected" park system. As humans and lions increasingly come into contact, the solutions are not easy or obvious. Perpetual vigilance and early warning of the presence of a lion is one method being used that works at a local scale, but lions are killed if they move out of such districts. Packer proposed fenced reserves as a method that may be more effective. He showed that humans do not kill lions (except for sport) if there is no reason to retaliate. Impeding contact with humans and livestock with a fence removes this incentive, and hence, protects both lions and people. In David Macdonald's (Oxford University) concluding talk, he threaded together many of the themes presented throughout this session. In "Vantage points in a landscape of fear," Macdonald described how the fear of large carnivores affects not only their herbivorous prey, but less dominant or smaller carnivores as well. MacDonald provided many examples, across a plethora of species on several continents, that prey and intra-guild predators alike frequently respond to the presence of the most feared animal in any system by shifting their activity so as to reduce overlap. Sometimes the shift reduces spatial overlap, but it is more often temporal; animals considered mostly diurnal will become nocturnal (and vice versa) to avoid life-threatening encounters. This is true whether we are talking about the prey of Sunda clouded leopards in Sumatra, or prey at waterholes patrolled by lions, or the activities of smaller predators like mink who temporally avoid otters in England, foxes that avoid the fearful jackal in southern Africa, or cheetahs and leopards that are persecuted by lions. Macdonald pointed out that the most feared animal in the African landscape, the lion, is itself fearful of one species only, humans.

In response, lions will avoid humans. In desperate times, when their preferred native prey are absent, lions will risk contact with humans to kill their livestock, but by doing so, lions often end up killed themselves.

The final session of the conference brought us back to many of the themes involved in the formation of fear memories and the loss of species, but this time from an evolutionary perspective. In the session the "Evolutionary Ecology of Predator–Prey Interactions," Johanna Mappes (University of Jyväskylä) described her work examining how "Predator community structure affects how predator foraging selects for variation in defense strategies." Mappes added a new twist to the idea that prey must form fear memories as a first step in responding to a predator. She showed, through a series of excellent manipulations, that the aposematic coloration of prey frequently exploits the fear memories of their predators who, in turn, have an "innate" or learned fear of the patterns or colouration of *their* predators. Sometimes, however, aposematism can backfire, and Mappes described how the pet trade for the venomous adder is leading to the decline of its aposematic and nonvenomous counterpart as a result of misidentification. The introduction of exotic predators has led to the extinction and population declines of many species worldwide. While some prey are clearly naïve to these exotics, others do respond appropriately. Understanding this variation was the focus of the final talk of the conference by Andy Sih (University of California, Davis) who described theory regarding the "Evolution of novel predator–prey interactions in a human-altered world." Sih used signal detection theory to outline how prey uncertainty about what is safe vs. dangerous and the relative costs of over- vs. under-responding to risk, can be used to generate predictions on when naïve prey should be expected to respond appropriately to novel dangers. Some memories can also be "overlearned," which brings us back to mental health issues, such as PTSD.

Given the extraordinary interdisciplinary breadth of the talks, posters, discussions, and participants, all members of the group were able to meet a variety of scientists that they never would have encountered before, and were exposed to ideas regarding predation risk effects that would force them to think outside the box. We are certain that many of the collaborations that clearly formed and developed at this conference will yield a plethora of first-rank, innovative papers. The success of this inaugural Gordon Research Conference on Predator–Prey Interactions has ensured that this conference series will continue. The next conference will be held in the winter of 2016 with Andy Sih as Chair, and Co-Vice-Chairs Evan Preisser and Jaqueline Blundell. We hope to see you there.