



Professor Laura-Ann Petitto
Recipient of the Sin Wai-Kin
Distinguished Visiting Professorship in the Humanities
at the University of Hong Kong
Schedule of Formal Lectures
January 2015

Event: Lecture 1

Intended Audience: From Dr. Nancy Law (University of Hong Kong). “Seminar for colleagues in the Faculty of Education, University of Hong Kong. There are two purposes for this seminar: (1) to dispel the notion that much of education research has little to do with [the Science of Learning], and (2) to introduce you to colleagues in the Faculty and to stimulate discussions and explorations on research projects and collaborations between our colleagues and you.” ...specifically, to identify your role in the Science of Learning and Educational Neuroscience.

Petitto Abstract for Lecture 1

Date: January 8, 2015, 2:15-3:15

Title: “How babies discover language: Insights from a research journey spanning chimpanzees to children, and from co-founding the new discipline of Educational Neuroscience.”

Name and Affiliation

Professor/Dr. Laura-Ann Petitto

Co-Principal Investigator, and, Science Director of the National Science Foundation, Science of Learning Center, Visual Language and Visual Learning (VL2).

Scientific Director: Brain and Language Laboratory for Neuroimaging (BL2)

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How is the remarkable feat of human language acquisition possible? Traditional answers have assumed that the development of the mechanisms for producing and perceiving speech are critical for normal language acquisition, and specifically determine the maturational time course, structure, and content of early language acquisition, and its organization in the brain. In this seminar, I will trace my personal journey spanning three decades of studies involving multiple species (chimpanzee and child), ages (infants through adults), populations (monolingual and bilingual), modalities (signed languages and spoken languages), and brain imaging technologies. I will

identify the specialized brain tissue that helps all babies “discover” their native language. It is also the neural tissue that makes possible a young baby’s capacity to know it is receiving two languages as compared to one language, well before knowledge of word meanings (early *Bilingualism*). It further provides new insights into the optimal age and ways of exposing bilingual children to two reading systems.

Along this passionately pursued journey, I will stop to marvel at remarkable changes in science. This journey traverses my conversations with B.F. Skinner about Behaviorism, to the birth of Cognitive Science, and then Cognitive Neuroscience—where cliff-hanging discussions with Noam Chomsky abounded regarding the discipline’s implications for the study of human language. It spans my own role in advancing Developmental Cognitive Neuroscience, and my role in the National Science Foundation’s first cohort in the USA to receive a Science of Learning Center grant at Dartmouth, a major university in the USA (Hanover, NH, 2004), where I was Chair of its Department of Education for five years. While in this role, I created the “Department of Educational Neuroscience and Human Development,” the first undergraduate program in Educational Neuroscience in the USA (2002) as well as the first State of New Hampshire accredited Teacher Certification Program to incorporate Educational Neuroscience formally in the curriculum for the training of future teachers.

Throughout our discussions, I will lay bare the intimate relationship between the Science of Learning (focusing on brain and behavior studies of learning across the lifespan) and its daughter discipline, Educational Neuroscience (focusing on brain and behavior studies of learning at the heart of early child development and early schooling, specifically involving 5 key domains: language and bilingualism, reading and literacy, math and numeracy, science and critical thinking, and social-emotional-moral cognition). Bringing us to the present, I will highlight some of the exciting features of the first PhD in Educational Neuroscience program that I co-founded at Gallaudet University, which is the natural outgrowth of our National Science Foundation Science of Learning Center, Visual Language and Visual Learning. To be sure, our PhD in Educational Neuroscience program is one of our NSF Science of Learning Center’s lasting legacies.

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Event: Public Lecture 2

Intended Audience: From Dr. Nancy Law (University of Hong Kong). Identify how research “on neuroscience and education can be relevant to the broader humanities disciplines.” “...the target audience [includes] the Faculty members, research staff and students in various [Humanities] units and across campus more generally. We would like to make this an occasion to introduce you and your work to colleagues in the humanities areas...” “...we would like the theme/focus to be on [the Science of Learning] research and the Humanities.

Petitto Abstract for Lecture 2

Date: Jan 12, 2015

Title: “Humanities and the Science of Learning: Revealing the essence of human thought.”

Name and Affiliation

Professor/Dr. Laura-Ann Petitto

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Visual Language and Visual Learning (VL2).

Scientific Director: Brain and Language Laboratory for Neuroimaging (BL2)

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The disciplines of Neuroscience and Education are infused with the Humanities and provide new answers and two-way enrichment among the disciplines. In my laboratory, I have conducted research on the reading brain, the dancer’s brain, the bilingual brain, the limits and great expanses of the “neurally plastic” brain, the chimpanzee’s brain, and the “silent” brain: What happens when the lion’s share of knowledge comes in through the human eye instead of through the human ear? What does visual poetry look like? How does the decoding of print on the page in alphabetic languages proceed when there is no sound? Here, the discovery of the existence of Visual Sign Phonology as the gateway to reading has radically altered our conception of language as being tied to speech. Does the learning of dance – that is, learning in the classical Arts – afford cognitive benefits to the young child’s learning of *other* domains of knowledge that have nothing to do with dance or the Arts. The answer is yes it does! The benefits of learning the Arts render profound higher cognitive benefits to human learning and thinking in ways we never before knew possible. The Humanities and the neurosciences ultimately seek answers to common questions. Yet each does so using different methods. While we carve up these disciplines and their methods in distinct ways, the human brain does not. By joining forces, the Humanities, Neuroscience, and Education can vastly refine our understanding of, for example, the structure of the *human story* (both our public and private narratives) and the structure of human thought (especially social and cultural thought). This union of disciplines provides new perspectives on why we organize history around collective thoughts about past events, or explore the power of literature to represent consciousness. To be sure, the discipline called the Science of Learning/Educational Neuroscience helps us combine these seemingly disparate types of knowledge together in ways that lay bare the essence of human thought, reasoning, memory, morality, ethical conduct, and aesthetics, and, ultimately, what it means to human.

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Event: Public Lecture 3

Intended Audience: From Dr. Nancy Law (University of Hong Kong). “The intended audience of this talk is the public, particularly the officials and policy makers in the Education Bureau, school organizations, principals, teachers, parents and those in the

community who are interested in education developments in HK...we want the broader practitioner community & policy makers to have some understanding of what this field of research is about [the Science of Learning] and why does it matter to them.”

Petitto Abstract for Lecture 3

Date: Jan 17, 2015

Title: “The ‘Science of Learning’ – Why it matters to schools and families—and all interested in the future of society.”

Name and Affiliation

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What is the Science of Learning? The 21st Century presents challenges for our children and society like none ever in the history of our species. It is now “normal” for children to interact with, and learn from, machines on a daily basis (e.g., tablets, mobile phones, moocs) spanning home and classroom. Our children will grow up to learn new knowledge that is presently yet to be discovered. While we cannot prepare for every type of new knowledge that is to come, we can best prepare by understanding how we learn. The Science of Learning is an interdisciplinary field that involves the integration of research and knowledge across multiple disciplines to form a powerful new lens on learning. Science of Learning studies yield new discoveries about how we learn most optimally, how different types of knowledge domains draw on different types of learning mechanisms, as learning is not “one size fits all” (learning math is different from learning to read, etc.). Learning both changes the human brain and differs across the lifespan. A critical question is how can we use these research discoveries to design and promote optimal learning across life, as well as educational practice and policy for our children so that they may have the social and cognitive agility to face and survive an ever-evolving technological future? We will explore the roots of this exciting interdisciplinary science and the broad range of questions that researchers ask and answer. Why are combined brain and behavior studies revolutionizing our understanding of learning? (What does the brain tell us anyway?) I will provide an illustrative example of how Science of Learning researchers have provided stunning new insights into the developing brain of the bilingual child. This work bursts old myths about bilingualism, dispels old fears regarding learning, informs us of developmental imperatives for enabling children to achieve the most powerful bilingual learning—and which provides a new view on the very nature of human learning. Policy makers in the Education Bureau, school organizations, principals, teachers, parents and all interested in the future of society are invited to come!