

# PUBLICATION-BASED PRESENTATION: Modeling Human Creative Cognition using AI Techniques

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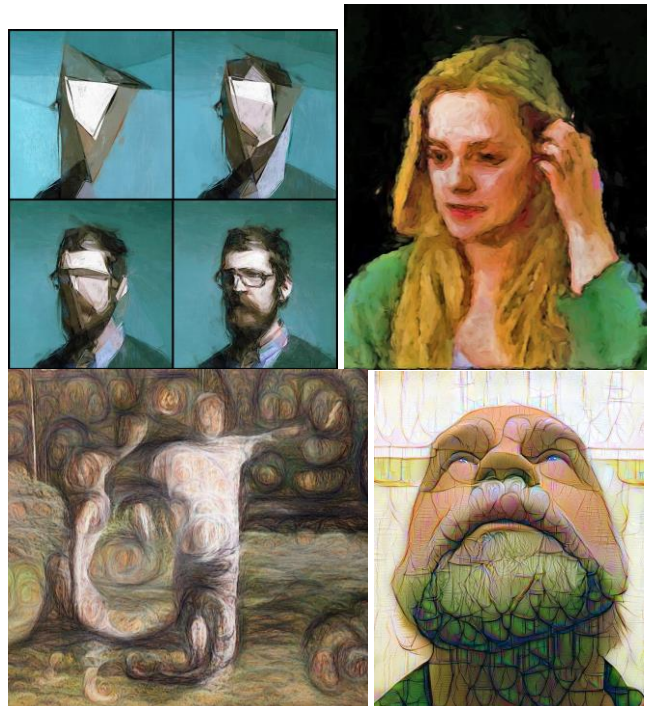
DiPaola's research endeavors to build top down Artificial Intelligence (AI) models of human creativity, empathy and expression for both use in new forms of computation systems as well as analysis of how the creative mind works. In doing so he has interviewed hundreds of artists, writers and musicians on how they perceive their creative talent and its originals. Combined with research from neuro-aesthetics and computer modelling, DiPaola notes that while many creative individuals report that they believe new insights as coming into them from an external source during creative flow, that evidence point to these new creative ideas and interpretations often more likely have internal roots from the individual's, mid and long term past experiences and processes. DiPaola attempts to model this and other human creativity processes in computational form often as AI systems such as deep learning, reinforcement learning and evolution programming. Two efforts underway in DiPaola's research lab are mapping out the creative process of a fine art portrait painter using 5 hierarchical AI systems, as well as modelling an empathetic embodied character agent who can understand emotions from those she talks with and construct creative narrative or quote like responses.

The common view that our creativity is what makes us uniquely human suggests that incorporating research on human creativity into Artificial Intelligence (AI) based generative deep learning techniques might be a fruitful avenue for making their outputs more compelling and human-like, especially in arts such as the creative arts. Using our labs original AI systems such as our deep learning convolutional neural networks and cognitive based computational art rendering systems, we attempt to show how human creativity can be implemented/modelled computationally, and demonstrate their impact on the resulting digital generative art. Conversely, he will discuss how explorations in creativity AI can inform our understanding of human creativity and its foundations.

DiPaola will discuss and demonstrate his lab's approach (ivizlab.sfu.ca) to cognitively modeling a fine art painter process by integrating Deep Learning AI with novel computational novel NPR approaches. This interdisciplinary (cognitive science / arts / AI) work brings cognitive creative

fields together with Deep Learning neural networks. DiPaola will demonstrate and discuss the lab new work as well as the applications spaces in interactive arts, health and a recent Google / Knight Foundation granted project using creative painterly emulation as a new approach to anonymize interviewees in documentary videos where the study data shows improvement to overall empathy and engagement compared to current techniques.

Steve DiPaola, past Director of the Cognitive Science Program at Simon Fraser University (SFU), is currently is a Professor and lab director of the iVizLab, a PhD based lab on Artificial Intelligence using human cognition theories of creativity, empathy and expression. He came to SFU from Stanford University where some of his creative AI systems were used in generative game creation including the best-selling game of that year, "The Sims". DiPaola has over 100+ peer reviewed papers in AI/cognition and \$2 million in past/current funding in AI related areas of cognitive creativity and expression. As both a scientist and artist, DiPaola has written code for his AI "creative on its own" artworks that has been shown in major galleries and museums including The Whitney, The Smithsonian, Tate, and gallery's in NYC, London and LA.



## DiPaola Papers

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