SCIENCE AND TECHNOLOGY TALKS
Professor Oge Marques, PhD

Bringing science and technology to a broad audience of lifelong leaners

This catalog presents a series of lectures developed by Professor Marques especially for lifelong learners. The talks cover topics related to science, technology, art, human vision, perception, and cognition.

Dr. Marques engages his audiences by translating complex technical knowledge to a format and language accessible to participants of every age and background.

Adopting a lighthearted approach, and using a rich set of images and videos, Professor Marques illustrates the topics of each talk with a large number of examples of applications.

Professor Marques is available to speak at different events and venues, including company meetings and retreats, nursing homes, community centers, schools, and other organizations.

To book a talk, please contact Dr. Marques at: **oge @ogemarques.com** or **(561) 866-7144**.

Can you trust what you see?
The magic of visual perception

Professor Oge Marques, PhD

Vision is our most developed sense and one upon which we rely to make many decisions, conscious or otherwise. Many of our everyday interactions, such as driving a car, greeting familiar faces on the street, and deciding which dish to order at a restaurant or which brand of products to purchase online, are guided by our visual sense.

For the most part, this works well. But sometimes we are reminded of our visual system's limitations and surprising behavior through visual illusions that exploit misjudgments in size, distance, depth, color and brightness, among many others.

This talk explores many visual perception phenomena that challenge our common knowledge of how well we detect, recognize, compare, measure, and interpret everyday scenes.

Participants will be introduced to a series of visual perception phenomena with applications in everyday life, such as:
- the use of negative space in logos
- the impact of salient colors in product packages
- our ability to recognize familiar faces even when they are severely blurred
- the importance of context to recognize familiar objects

among many others.

Dr. Marques will present a large number of examples of optical illusions and other visual phenomena that will make you wonder: **can you really trust what you see?**

To book this talk, please contact Professor Marques at:
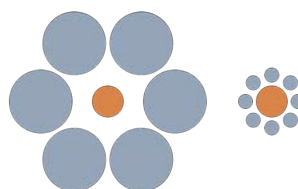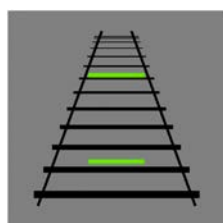
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Visual intelligence – how to use works of art to sharpen our perception of the world

Professor Oge Marques, PhD

Research in the fields of vision and cognitive sciences shows that our ability to see the world around us, make sense of what we see, and act upon the information received through the eyes and processed by the brain is a skill that can be improved by training and practice, at any age.

This talk shows how we can use visual illusions (and other visual aspects which can be gleaned from selected works of art) to increase our overall ability to perceive the world around us.

Participants will be introduced to a series of strategies to increase their visual intelligence, such as:

- how to pay more attention to relevant details in visual scenes
- how to shift perspectives while inspecting an image or video
- how to answer fundamental questions (*who, what, where, when, why*) based on visual information
- how to communicate what we learn from those images to other people.

Along the way, we will also address the important aspects of biases, assumptions, and perceptual (subconscious) filters.

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Looking through the artist's eyes

Professor Oge Marques, PhD

A complete understanding of the biological and psychological processes involved in human vision and cognition requires good knowledge of our primary visual sensor: the eye. Before we can make sense of the world around us and act upon the information received through the visual sense, it is essential that our eyes perform their function properly at all times. Alas, this is hardly the case: sooner or later, some of us will require correcting lenses and, later in life, might develop other impairments associated with the aging eye, such as cataract, glaucoma, macular degeneration, or complications associated with diabetes, to name a few.

This talk shows how the work of several world renowned visual artists may have been influenced by specific ophthalmological impairments that they may have suffered.

Participants will be introduced to a series of works of art that will elicit provocative questions, such as:

- Why do Georges Seurat's paintings appear to shimmer?
- Could the choice of colors and strokes in Monet's waterlily paintings be related to his cataracts?
- Did Van Gogh's striking use of the yellow color relate to a rare medical condition (xanthopsia)?

Along the way, we will also review some of the most important associated aspects of human vision, such as brightness, contrast, color and edge perception, and 3D perspective from 2D scenes.

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Face recognition by humans and computers

Professor Oge Marques, PhD

The human visual system is remarkably good at recognizing faces, an ability that we acquire shortly after birth and refine during our lifetime. Surprisingly enough, there are not enough facts and observations to build a coherent theory of face recognition in humans. This hasn't stopped computer scientists and engineers from building face recognition solutions that can be used in a variety of applications, from suggesting the name of a friend to tag in a picture on Facebook to authorizing access to restricted areas using a person's face as a form of biometrics.

This talk explores several aspects related to how well we recognize faces and discuss how some of these findings have been used to empower computers with comparable abilities.

Adopting a lighthearted presentation style and terminology suitable for non-experts, Dr. Marques will present a large number of images and videos containing examples of face recognition phenomena to which all of us can relate, such as:

- our ability to recognize familiar faces even when they are severely blurred
- the use of facial features to detect emotion
- our uncanny ability to see faces in everyday objects
- why we enjoy seeing caricatures
- what science can learn from those of us who have superior facial recognition skills

We will also discuss cases in which these abilities fail – a cognitive disorder known as face blindness or prosopagnosia – and what they can teach us about the human brain. Finally, Dr. Marques will summarize the state of the art in facial recognition by computers and its implications, particularly concerns with security and privacy

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Self-driving cars, robot radiologists, and the future of AI

Professor Oge Marques, PhD

Artificial intelligence (AI) has experienced significant growth during the past decades, thanks to advancements in software and hardware that have enabled better-than-human performance in many tasks, including highly publicized breakthroughs, such as self-driving cars or medical image analysis systems that might replace the human radiologist. Along with the speed and intensity at which the technical advancements are reaching the headlines, there are growing concerns about the social, ethical, economical, and philosophical aspects of AI, which have provided the script for many Hollywood blockbusters and successful TV series.

This talk provides an introduction to artificial intelligence and related topics to a non-technical audience.

Participants will be introduced to fundamental technical topics and a rich collection of contemporary successful examples of AI in action. Along the way, we will also address some of the most frequently asked questions, such as:

- What does it mean to say that a computer/robot exhibits intelligent behavior?
- Are we getting closer to solving the general intelligence problem?
- Will computers/robots replace humans, and – if so – how soon and in which areas?

Chess

IBM's Deep Blue beats chess master Gary Kasparov (1997)

Jeopardy!

IBM's Watson wins against two of the greatest winners in the TV game show Jeopardy! (2011)

AlphaGo

Google DeepMind becomes the first computer program to beat a human professional Go player (2015)

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PROF. OGE MARQUES – BRIEF BIOGRAPHY

Oge Marques is a Professor of Computer Science and Engineering in the College of Engineering and Computer Science and, by courtesy, a Professor of Information Technology in the College of Business at Florida Atlantic University (FAU) (Boca Raton, FL). He received his PhD in Computer Engineering from FAU in 2001 and a Master's in Electronic Engineering from Philips International Institute (the Netherlands).

He is a world-renowned expert in the area of *intelligent processing of visual information*, which encompasses the fields of image processing, computer vision, human vision, artificial intelligence and machine learning.

He is the author of nine technical books, one patent, and more than a hundred scientific articles in his fields of expertise. He has more than 30 years of teaching experience in different countries (USA, Austria, Brazil, Netherlands, Spain, France, and India).

He is a Senior Member of both the IEEE (Institute of Electrical and Electronics Engineers) and the ACM (Association for Computing Machinery). He is also a Tau Beta Pi Eminent Engineer and a member of the honor societies of Sigma Xi, Phi Kappa Phi and Upsilon Pi Epsilon.

Dr. Marques is an ***ACM Distinguished Speaker*** and has won several teaching awards, including the *Outstanding Mid-Career Teaching Award*, American Society for Engineering Education - Southeastern Section (ASEE-SE) (2011) and the *Excellence and Innovation in Undergraduate Teaching Award*, Florida Atlantic University, twice (2011 and 2004).

He speaks Portuguese, Spanish, and French. In his spare time, he enjoys traveling, watching soccer, listening to jazz, and reading philosophy and psychology books. He lives in Boca Raton, FL with his wife.

Contact information:

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