#AAD2019

# Highlights AEDV

## In 77TH AAD Congress

## 1-5 March 2019

★ Washington ★

Scientific Initiative of:

Sponsored by:

NOVARTIS

#AAD2019

Highlights AEDV

IN 77TH AAD CONGRESS

1-5 MARCH 2019

★ WASHINGTON ★

# Mainstreaming and tecnologic innovation

Dr. Pablo Boixeda

Scientific Initiative of:

Sponsored by:

NOVARTIS

## 1. DerMATHology

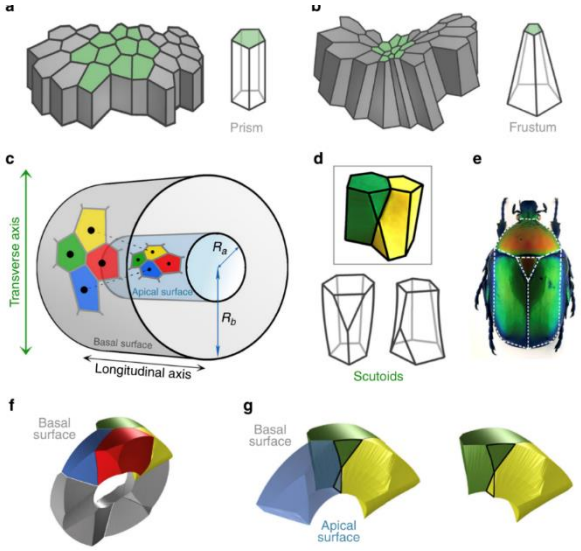
## 2. Artificial Intelligence

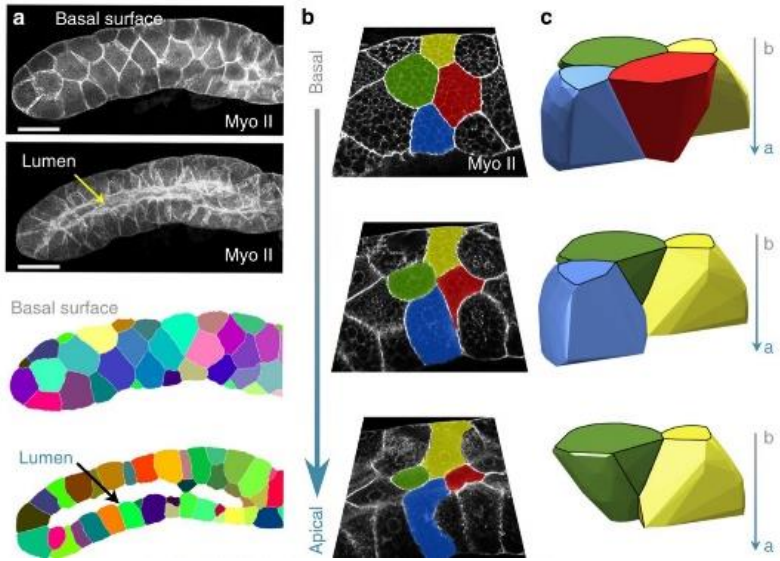
## 3. Skin Imaging

## 4. Innovation

# SCUTOIDS: NEW GEOMETRICAL STRUCTURE

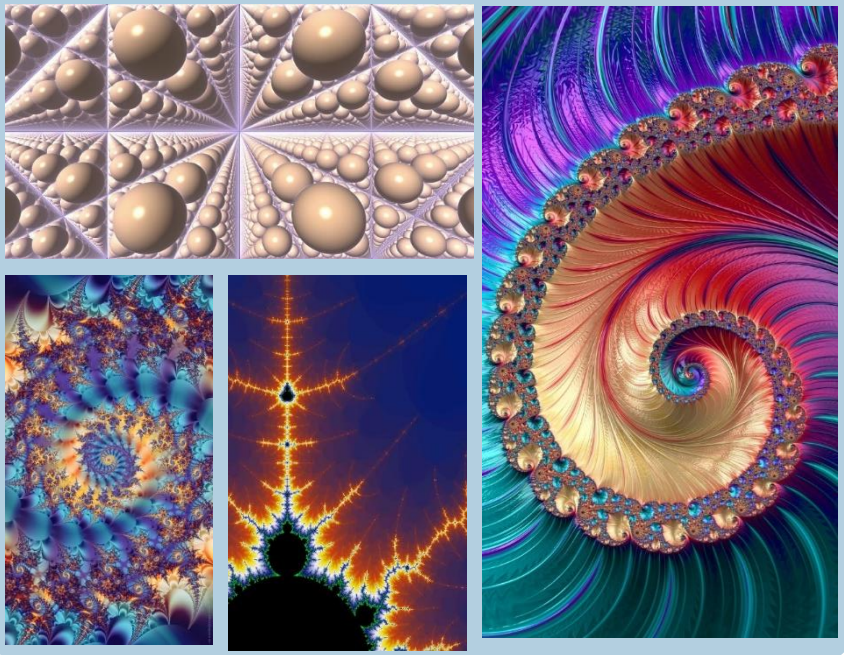
"Scutoids are a geometrical solution to three-dimensional packing of epithelia.", Escudero L et al




# FRACTALS

## FRACTALS

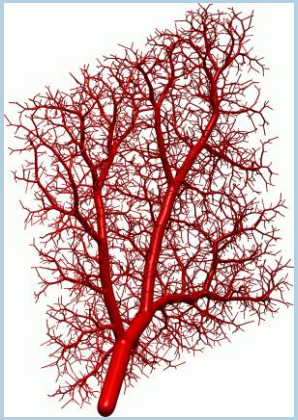


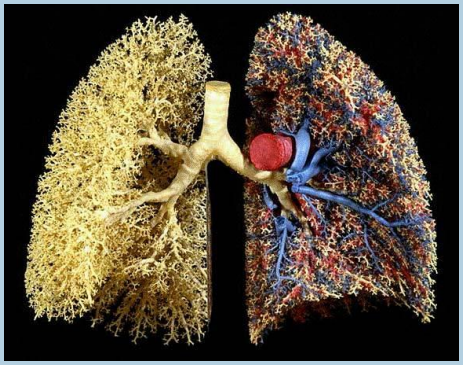
## FRACTALS IN NATURE

**Non-regular geometric shape with a never ending pattern**

# FRACTALS

## FRACTALS IN HUMAN BODY





## FRACTALS IN DERMATOLOGY

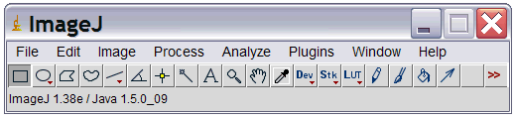
# FRACTALS

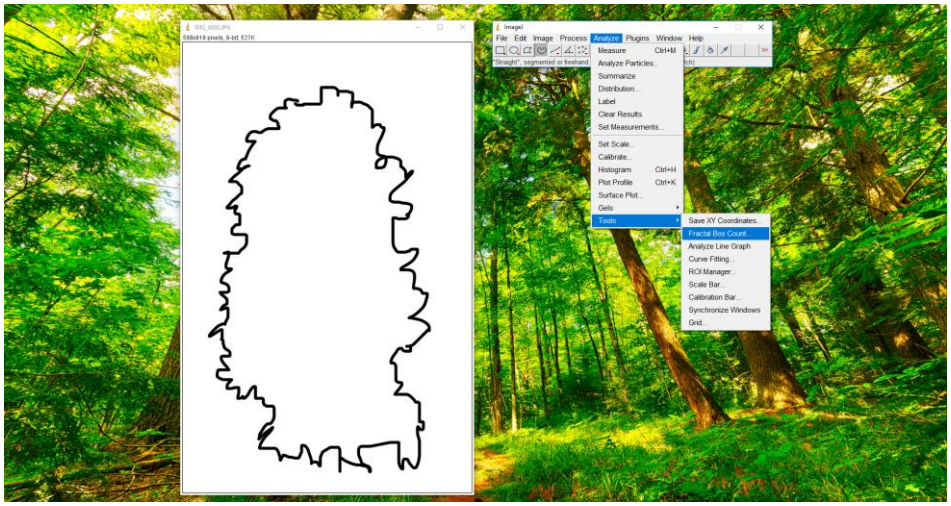
## LICHTENBERG FIGURES

## LIGHTNING

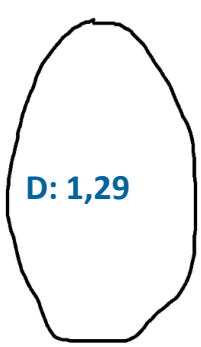
# CAN WE MEASURE IRREGULARITY?

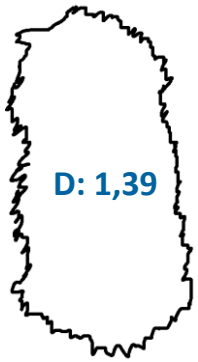
ImageJ
Image Processing and Analysis in Java




## FRACTAL DIMENSION






# ARTIFICIAL INTELLIGENCE (AI)

*MACHINE LEARNING(ML) : Deep Learning (DL)*

AI ML DL

# THE INEVITABILITY OF CHANGE

**Old school**

Until 2000

2000 Until today

**Business Era**

From now

**Technology Era**

- Telemedicine
- Regenerative medicine
- Nanotechnology
- Genetics
- Artificial Intelligence (AI)

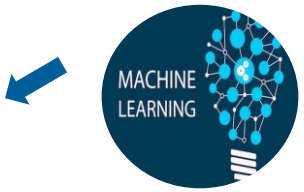
Clinics in Dermatology (2019) 37, 4–11
ELSEVIER

**The inevitability of change**

**Rokea A. el-Azhary, MD, PhD***

*Department of Dermatology, Mayo Clinic College of Medicine and Science, Rochester, Minnesota, USA*

# MACHINE LEARNING

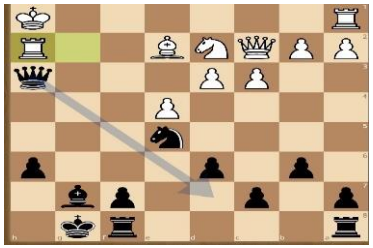



Detect ***Patterns***

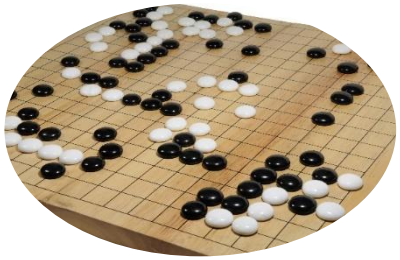
Machine learning (ML):
Data set → ***Algorithms*** → Predictions

Self-driving cars


Language translation

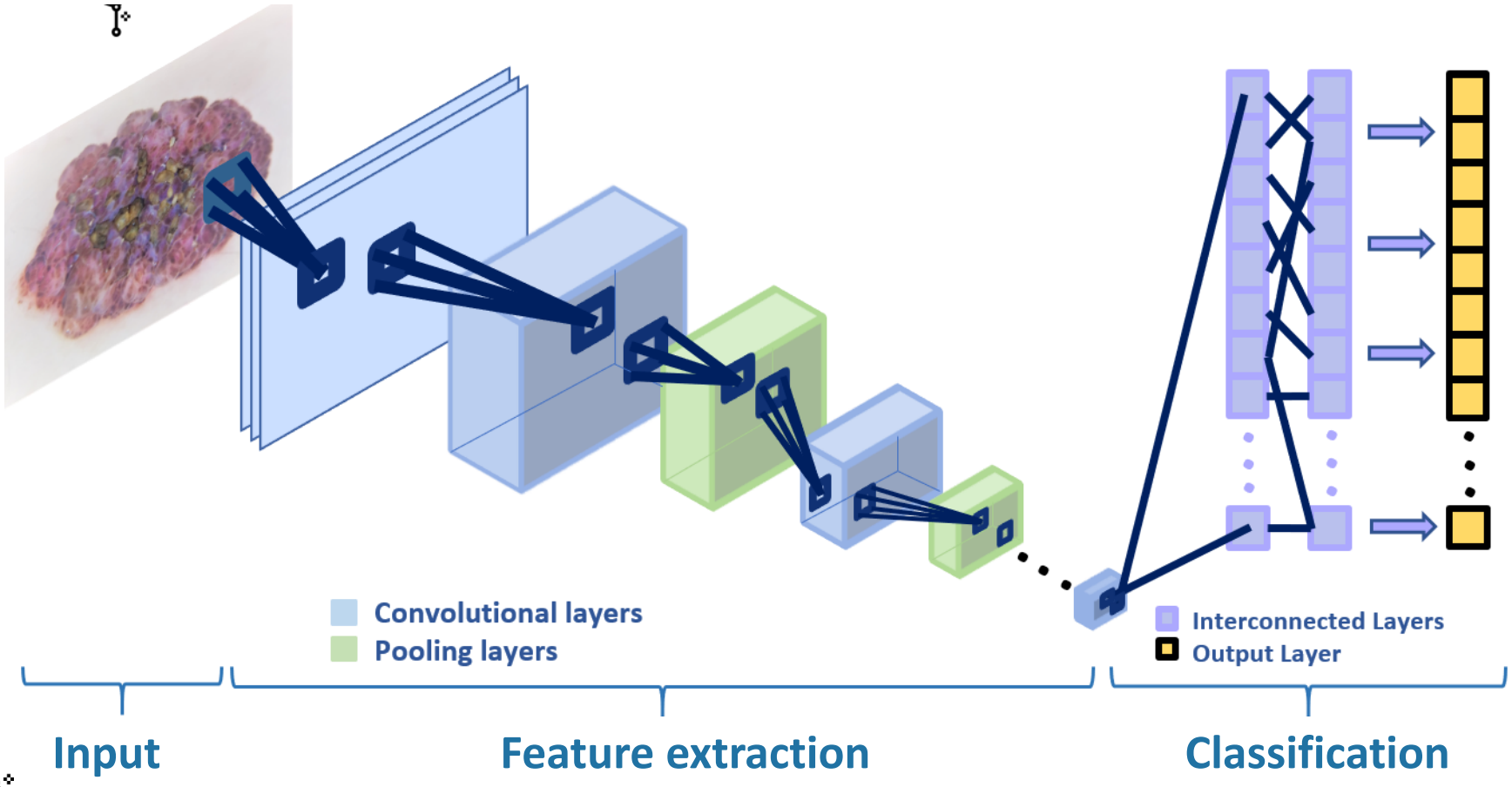


Chess

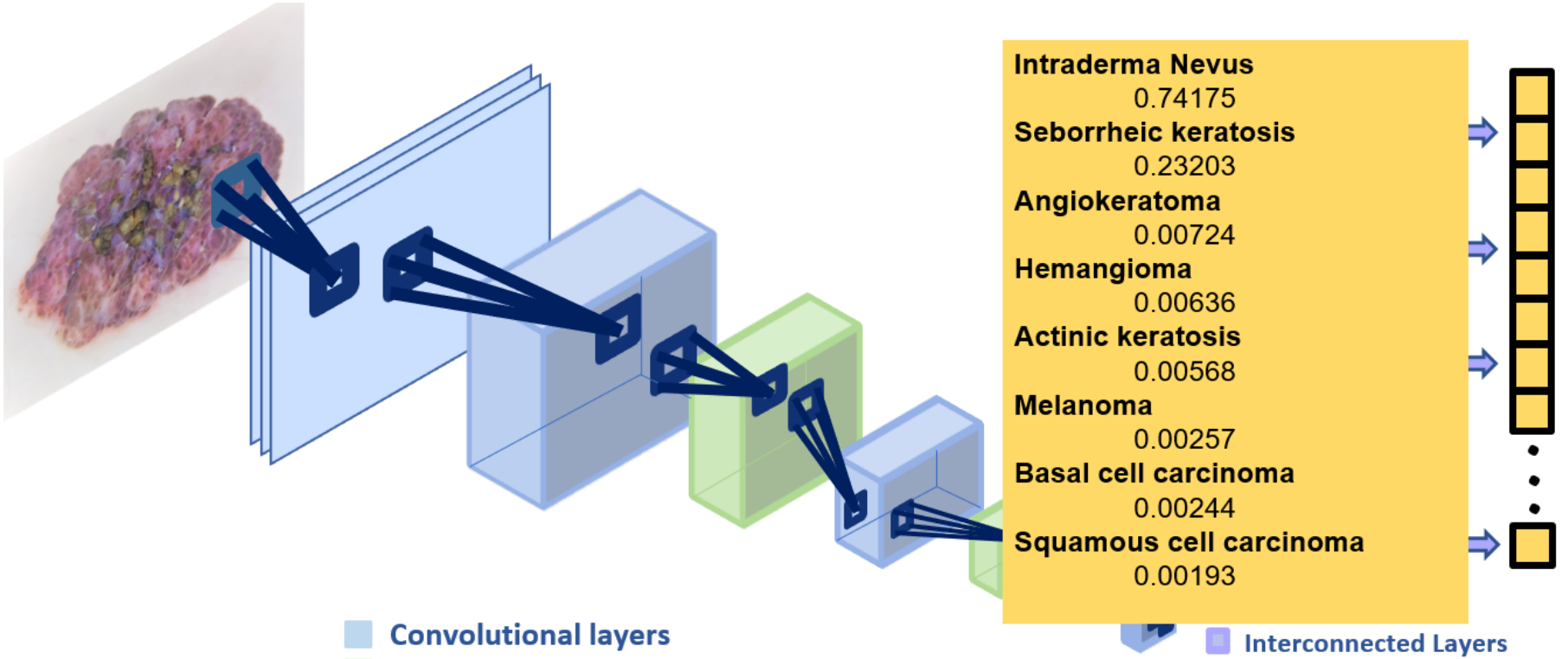


Go

# CONVOLUTIONAL NEURAL NETWORK



# CONVOLUTIONAL NEURAL NETWORK



# MILESTONE

## *Convolutional neural networks*

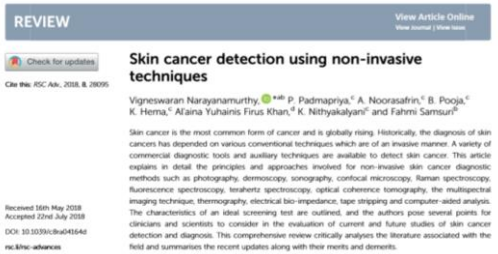
**Dermatologist-level classification of skin cancer with deep neural networks**

Andre Esteva[1]*, Brett Kuprel[1]*, Roberto A. Novoa[2,3], Justin Ko[2], Susan M. Swetter[2,4], Helen M. Blau[5] & Sebastian Thrun[6]

Nature 2017

- Trained with 130.000 images
- **Machine against *21 dermatologists***
- Similar results
- High sensitivity and specificity (>91 %).

# IMAGING THE SKIN



REVIEW View Article Online

Check for updates

Cite this: *RSC Adv.*, 2018, **8**, 28095

**Skin cancer detection using non-invasive techniques**

Vigneswaran Narayanamurthy,[a]*[b] P. Padmapriya,[c] A. Noorasafrin,[c] B. Pooja,[c] K. Hema,[c] Alaina Yuhainis Firus Khan,[d] K. Nithyakalyani[c] and Fahmi Samsuri[b]

Skin cancer is the most common form of cancer and is globally rising. Historically, the diagnosis of skin cancers has depended on various conventional techniques which are of an invasive manner. A variety of commercial diagnostic tools and auxiliary techniques are available to detect skin cancer. This article explains in detail the principles and approaches involved for non-invasive skin cancer diagnostic methods such as photography, dermoscopy, sonography, confocal microscopy, Raman spectroscopy, fluorescence spectroscopy, terahertz spectroscopy, optical coherence tomography, the multispectral imaging technique, thermography, electrical bio-impedance, tape stripping and computer-aided analysis. The characteristics of an ideal screening test are outlined, and the authors pose several points for clinicians and scientists to consider in the evaluation of current and future studies of skin cancer detection and diagnosis. This comprehensive review critically analyses the literature associated with the field and summarises the recent updates along with their merits and demerits.

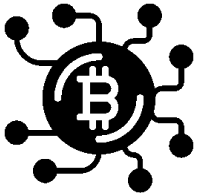
Received 16th May 2018
Accepted 22nd July 2018
DOI: 10.1039/c8ra04164d
rsc.li/rsc-advances

- **Existing technologies :**
  - Dermatoscopy
  - Ultrasound
  - Confocal microscopy
  - Optical coherence tomography
- **Future:**
  - **Raman Spectroscopy**
  - **Multiphoton Laser Microscopy**
  - **Photoacustic imaging**

# CONCLUSIONS

✓ DEEP LEARNING

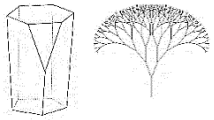

✓ BLOCKCHAIN

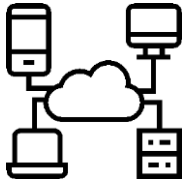


✓ LASERS

✓ IMAGING SKIN

✓ SCUTOIDS/ FRACTALS





✓ INNOVATION

*Encourage you to embrace technology in all these different areas rather than seeing it as a threat*