

# Antonio Rueda-Toicen

SOFTWARE ENGINEER · (DATA) SCIENTIST

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“A system of cells interlinked within one stem...”

## Education

### Central University of Venezuela

Caracas, Venezuela

MASTER'S DEGREE IN BIOENGINEERING

Jan. 2014 - April 2017

- Biomedical computer vision programme.
- Thesis: Classification of brain tumors in multimodal MRI with network automata
- Advisor: Miguel Martín-Landrove

### Central University of Venezuela

Caracas, Venezuela

LICENTIATE DEGREE IN COMPUTER SCIENCE

Mar. 2007 - Oct. 2013

- Specialization in Computer Graphics.
- Thesis: Segmentation of brain tumors in multichannel MRI with GPU-parallelized cellular automata
- Advisors: Miguel Martín-Landrove and Rhadamés Carmona

## Skills

**Languages** English (fluent, C2-level, TOEFL IBT score 107120), Spanish (native)

**Software development** I've delivered production-level software for professional and academic purposes using Python (scikit-learn, pandas, OpenCV, TensorFlow, PyTorch, Django), R (Shiny & RMarkdown), SQL, Java (Spring, Hibernate & GWT), Javascript (Node.js, jQuery, Backbone & React), HTML5 + CSS3, Wolfram Language (Mathematica & Wolfram Cloud), Matlab (Image Processing Toolbox), C, CUDA, C#, C++, and OpenGL (GLSL). I'm also proficient in sysadmin tasks in Linux (Bash), version control and repository management with Git and Github, and document typesetting with  $\text{\LaTeX}$ .

## Experience

### Algorithmic Nature Group, LABORES for the Natural and Digital Sciences

Paris, France

SOFTWARE ENGINEER

January 2015 - current

- Development of software to provide numerical estimations of Kolmogorov complexity and empirical study of the properties of Turing machines, cellular automata, and complex networks
- Development of the Online Algorithmic Complexity Calculator  
www.complexitycalculator.com
- Tools used: R, Shiny, Python, HTML5 + CSS3, Javascript, Wolfram Language

### National Institute of Bioengineering, Central University of Venezuela

Caracas, Venezuela

INSTRUCTOR AND RESEARCHER

April 2017 - current

- Instructor (rank: “Professor Instructor”) at the Center of Medical Visualization
- Research in biomedical computer vision focused in the segmentation and characterization of brain tumors in MRI
- Research on cellular automata, complex networks, information theory, and fractal geometry
- Supervision of biology and computer science thesis projects.
- Courses taught: “Applications of fractal geometry to biomedicine” and “Software development for scientists and engineers”

## ItBit Programme on Physical and Computational Sciences

Oxford, UK

OPERATIONAL AND PRODUCTION MANAGER

January 2015 - current

- Content and platform development for Massive Open Online Courses taught by scholars from leading institutions (Karolinska Institutet, Oxford University and Carnegie Mellon University), aimed at expanding general knowledge about cutting-edge research related to foundational questions of biology, physics, and computation.
- <http://www.itbit.org/about/>

## Santa Fe's Institute Complexity Explorer

Santa Fe, New Mexico

TEACHING ASSISTANT, ALGORITHMIC INFORMATION DYNAMICS: FROM NETWORKS TO CELLS

Jan 2015 - current

- Preparation of course material: tutorial videos and coding assignments for the Complexity Explorer project
- <http://www.itbit.org/courses/information-theory-computational-biology/>
- Intro video available online at <https://youtu.be/uG7f4zt6tA>

## Udacity

Mountain View, California

MENTOR AND PROJECT REVIEWER: DATA ANALYSIS NANODEGREE

Dec 2017 - current

- Mentoring and project review for the Data Analyst Nanodegree at Udacity
- One on one coaching directed to students learning statistics, Python, R, SQL and Tableau

## Yttrium Technology LLC

Sunrise, Florida

LEAD SOFTWARE ENGINEER

October 2013 - May 2014

- Development of DICOM PACS solution for the storage and transmission of clinical medical image data
- Tools used: C#, Java, XNAT Server, DICOM

## Centege CA

Caracas, Venezuela

JAVA TRAINER AND CONSULTANT

January 2009 - October 2013

- Created course material to prepare students for Oracle's Certified Java Programmer exam
- Consulting: Servlets, JSPs, GWT, Hibernate, Spring

## Selected Publications

### Tumor Growth in the Brain: Complexity and Fractality

Springer Series in Computational Neuroscience

BOOK CHAPTER IN "THE FRACTAL GEOMETRY OF THE BRAIN": MIGUEL MARTÍN-LANDROVE, ANTONIO BRÚ, ANTONIO

RUEDA-TOICEN, & FRANCISCO TORRES-HOYOS

available online

2016

### Evolution Rules of Deterministic Cellular Automata for Multichannel Segmentation of Brain Tumors in MRI

Proceedings of CIMENICS XII

CONFERENCE ARTICLE: ANTONIO RUEDA-TOICEN, RHADAMÉS CARMONA, MIGUEL MARTÍN-LANDROVE, & WUILLIAN

TORRES

available online, with code repository on GitHub

2014

### Search of Complex Binary Cellular Automata with Behavioral Metrics

Complex Systems, Vol 24, No. 1

JOURNAL ARTICLE: JUAN C. LÓPEZ-GONZÁLEZ & ANTONIO RUEDA-TOICEN

available online, app available at: [cellular-automata.com/discoverer](http://cellular-automata.com/discoverer)

2015

## References

**Hector Zenil, Oxford University and Karolinska Institute** [hector.zenil@cs.ox.ac.uk](mailto:hector.zenil@cs.ox.ac.uk)

**Miguel Martín-Landrove, Central University of Venezuela** [mmartin@fisica.ciens.ucv.ve](mailto:mmartin@fisica.ciens.ucv.ve)

**Gabrielle Beans, Santa Fe Institute** [gabeans@santafe.edu](mailto:gabeans@santafe.edu)