

# Antonio Rueda-Toicen

SOFTWARE ENGINEER · (DATA) SCIENTIST

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*"A system of cells interlinked within one stem..."*

## Experience

### Algorithmic Dynamics Lab, Center for Molecular Medicine, Karolinska Institute

Stockholm, Sweden

RESEARCH PROGRAMMER

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 and Minimal Information Loss for Data Dimensionality Reduction  
[www.complexitycalculator.com](http://www.complexitycalculator.com)  
[www.complexitycalculator.com/MILS](http://www.complexitycalculator.com/MILS)
- Development of the Layered-BDM grayscale image and weighted network descriptor
- Tools used: R, Shiny, Python, PyTorch, HTML5 + CSS3, Javascript, Wolfram Language
- [www.algorithmicdynamics.net](http://www.algorithmicdynamics.net)

### Thinkful

New York City, USA

TECHNICAL EXPERT AND MENTOR FOR THE DATA SCIENCE BOOTCAMP

May 2018 - current

- Mentor of the data science bootcamp
- Individual mentoring on statistics, databases, experimental design, A/B testing, data visualization, and machine learning
- Mock interviewing of candidates and capstone project grading
- Tools used and taught: Python, SQL, Jupyter, pandas, numpy, matplotlib, seaborn, TensorFlow, deep learning

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

Caracas, Venezuela

INSTRUCTOR AND RESEARCHER

April 2017 - current

- 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"

### The Chain

Caracas, Venezuela

CHIEF TECHNOLOGY OFFICER | LEAD ENGINEER

December 2017 - current

- Management of fifteen developers working on four software projects on blockchain and artificial intelligence: Coinet, Airmed, Surgflow, Plastico
- Full stack software development and QA, tech stack: NodeJS, React, Hyperledger, Stellar, Ethereum, IPFS
- Translation of business needs into technical requirements
- <http://thechain.tech/>

### Udacity

Mountain View, California

MENTOR AND PROJECT REVIEWER: DATA ANALYSIS NANODEGREE

Dec 2017 - May 2018

- 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

### ItBit Programme on Physical and Computational Sciences

Oxford, UK

OPERATIONAL AND PRODUCTION MANAGER

Jan 2015 - May 2018

- Creation of content creation guidelines for programming assignments and videos.
- [www.itbit.org](http://www.itbit.org)

## Santa Fe's Institute Complexity Explorer

Santa Fe, New Mexico

TEACHING ASSISTANT, ALGORITHMIC INFORMATION DYNAMICS: FROM NETWORKS TO CELLS

Jan 2015 - May 2018

- 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>

## 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

## Skills

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**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, OpenCV), R (Shiny and RMarkdown), SQL, Java, Javascript (Node.js, jQuery, Backbone, React), HTML5, CSS3, Wolfram Language (Mathematica and 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 + repository management with Git and Github, and document typesetting with  $\text{\LaTeX}$ .

## Education

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### 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

## Selected Publications

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### 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

2014

available online, with code repository on GitHub

## Search of Complex Binary Cellular Automata with Behavioral Metrics

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

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

*Complex Systems, Vol 24, No. 1*

2015