

# Antonio Rueda Toicen

Personal website: [www.digital-spaceti.me](http://www.digital-spaceti.me)

Github: <https://github.com/andandandand>

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Researchgate profile: [Antonio\\_Rueda-Toicen](#)

## Current positions

*Software Engineer*

[Algorithmic Nature Group, LABORES for the Natural and Digital Sciences](#)  
since January 2015

*Instructor & Researcher*

[Instituto Nacional de Bioingeniería, Universidad Central de Venezuela](#)  
since April 2017

*Operational and Production Manager*

[ItBit Programme on Physical and Computational Sciences](#)  
since January 2015

*Teaching Assistant, Algorithmic Information Dynamics: From Networks to Cells*

[Santa Fe Institute's Complexity Explorer](#)  
since January 2015

## Education

2017

MASTER'S DEGREE IN BIOENGINEERING

Universidad Central de Venezuela

thesis: [Clasificación de Tumores Cerebrales](#)

[en Imagenología de Resonancia Magnética Multimodal con Redes de Autómatas](#)

2013

LICENTIATE DEGREE IN COMPUTER SCIENCE

Universidad Central de Venezuela

thesis: [Segmentación Multicanal de Tumores Cerebrales](#)

[en Imagenología de Resonancia Magnética con Autómatas Celulares](#)

[Paralelizados en GPU](#)

## Areas of specialization

Computer Vision • Machine Learning • Complex Adaptive Systems

## Publications

### BOOK CHAPTERS

- 2016 “*Dynamics of Tumor Growth: Complexity and Fractality*”  
Miguel Martín-Landrove, Antonio Brú, Antonio Rueda-Toicen, and Francisco Torres  
in [The Fractal Geometry of the Brain](#), editor: Antonio Di Ieva  
Springer Series in Computational Neuroscience

### JOURNAL ARTICLES

- 2016 “*A Decomposition Method for Global Evaluation of Shannon Entropy and Local Estimations of Algorithmic Complexity*”  
Hector Zenil, Fernando Soler-Toscano, Narsis A. Kiani, Santiago Hernández-Orozco,  
and Antonio Rueda-Toicen  
(submitted to *IEEE Transactions of Information Theory*)  
[ArXiv preprint available online](#)
- 2016 “*Unsupervised Segmentation of Multispectral Images with Cellular Automata*”  
Wuilian Torres and Antonio Rueda-Toicen  
accepted to the *Journal of the Faculty of Engineering, Universidad Central de Venezuela*
- 2015 “*Search of Complex Binary Cellular Automata Using Behavioral Metrics*”  
Juan López-González and Antonio Rueda-Toicen  
*Complex Systems*, 24(1)  
[available online](#)

### CONFERENCE ARTICLES

- 2016 “*Characterizing the Structure of Complex Protein-Protein Interaction Networks*”  
*Proceedings of CIMENICS 2016, XIII Congreso Internacional de Métodos Numéricos en Ingeniería y Ciencias Aplicadas*  
Allan Zea and Antonio Rueda-Toicen  
[available online](#)
- 2016 “*Clasificación de Imágenes Multiespectrales Utilizando Autómatas Celulares*”  
*Proceedings of the SELPER 2016, XVII International Symposium on Remote Sensing and Geographical Information Systems*  
Wuilian Torres, Wladimir Barrios, and Antonio Rueda-Toicen  
[available online](#)
- 2016 “*Segmentation of Dynamic Contrast-Enhanced Magnetic Resonance Images of the Prostate*”  
*Proceedings of CIMENICS 2016, XIII Congreso Internacional de Métodos Numéricos en Ingeniería y Ciencias Aplicadas*  
Wuilian Torres, Leonardo Cordero, Miguel Martín-Landrove, and Antonio Rueda-Toicen  
[available online](#)

- 2014 *“Evolution Rules of Deterministic Cellular Automata for Multichannel Segmentation of Brain Tumors in MRI”*  
*Proceedings of CIMENICS 2014, XII Congreso Internacional de Métodos Numéricos en Ingeniería y Ciencias Aplicadas*  
 Antonio Rueda-Toicen, Rhadamés Carmona, Miguel Martín-Landrove, and Wuilian Torres  
[available online](#)
- 2014 *“Unsupervised Segmentation of Multispectral Images with Cellular Automata”*  
*Proceedings of CIMENICS 2014, XII Congreso Internacional de Métodos Numéricos en Ingeniería y Ciencias Aplicadas*  
 Antonio Rueda-Toicen and Wuilian Torres  
[available online](#)
- 2014 *“Autómatas Celulares para la Segmentación y Clasificación de Imágenes Multiespectrales”*  
*Proceedings of V Jornadas Nacionales de Geomática y IX Jornadas de Educación en Percepción Remota en el Ámbito de Mercosur*  
 Antonio Rueda-Toicen and Wuilian Torres  
[available online](#)

## Other education

- 2014 WOLFRAM SCIENCE SUMMER SCHOOL 2014  
 Project: [Estimation of the fractal dimension of brain tumors.](#)

## Work experience

- 2013-2014 *Lead software developer*  
 Yttrium Technology LLC
- 2009-2013 *Java trainer and consultant*  
 Centege CA
- 2002-2013 *Translator & technical writer*  
 Translass AC
- 2010 *Web developer*  
 Softrain CA

## Languages

### HUMAN-TO-HUMAN

- Fluent, native level English
- Fluent, native level Spanish

## HUMAN-TO-COMPUTER

I've developed commercial software using the following programming languages:

- Python
- R
- SQL
- Java
- Mathematica
- C
- C++
- C#
- CUDA
- Matlab
- Javascript
- HTML + CSS

I'm also proficient in document typesetting with  $\text{\LaTeX}$ .

## IT professional certifications

2016	DATA SCIENCE SPECIALIZATION, Johns Hopkins University, via Coursera
2009	SUN CERTIFIED JAVA PROGRAMMER, Sun Microsystems
2002	MICROSOFT CERTIFIED SYSTEMS ENGINEER, Microsoft
2002	MICROSOFT CERTIFIED SYSTEMS ADMINISTRATOR, Microsoft

## Projects

### **Segmentation of Brain Tumors in Multichannel MRI with GPU-accelerated Cellular Automata**

Fast image segmentation method for radiosurgical planning.

[Code available @ GitHub](#)

### **Online Algorithmic Complexity Calculator**

The Online Algorithmic Complexity Calculator is an ongoing long term project of the [Algorithmic Nature Group](#) implementing semi-computable measures of algorithmic complexity.

**Live app at:** [www.complexitycalculator.com](http://www.complexitycalculator.com)

[Code available @ GitHub](#)

### **Cellular Automata Discoverer**

Java application that uses genetic search to find complex cellular automata with behavioral metrics similar to Conway's Game of Life in a non-totalistic Moore neighborhood.

[Available from www.cellular-automata.com/discoverer/](http://www.cellular-automata.com/discoverer/)

## References

Héctor Zenil

*Head of the ItBit Programme on Physical and Computational Sciences*

OXFORD UNIVERSITY & KAROLINSKA INSTITUTET

[hector.zenil@cs.ox.ac.uk](mailto:hector.zenil@cs.ox.ac.uk)

Miguel Martín-Landrove

*Director of Physics and Mathematics in Biomedicine Consortium*

UNIVERSIDAD CENTRAL DE VENEZUELA

[mmartin@fisica.ciens.ucv.ve](mailto:mmartin@fisica.ciens.ucv.ve)

Gabrielle Beans

*Program Manager of Online Education*

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