Dr. Alexandre de Siqueira

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alexdesiqueira

SKILLS: Image Processing, Computer Vision, Deep Learning, Machine Learning, Data Science, Pattern Recognition

TOOLS: Python (numpy, scipy, matplotlib, scikit-image, TensorFlow, fastai, scikit-learn, OpenCV), Git (GitHub, GitLab), R, GNU Octave, C

EXPERIENCE

scikit-image 2016 – 2022

Maintainer and contributor of scikit-image, a collection of algorithms for image processing.

- Reviews code contributions and performs library maintenance.
- Contributed with code for the Multi-Otsu threshold (skimage:3872), bilateral filter (skimage:4080), and documentation.

Tools: Python, git (GitHub, GitLab), CI/CD (GitHub Actions).

University of California, Berkeley, USA 2019 – 2022

Assistant project scientist at the Berkeley Institute for Data Science.

- Applied neural networks to the segmentation of two-dimensional biological images (in partnership with the Natural History Museum, London, UK) and three-dimensional computerized tomography data (in partnership with the Lawrence Berkeley National Laboratory, Berkeley, USA).
- Was the Data Science Outreach Lead at the BIDS–UpGlo Data Science partnership, creating a series of webinars to support US immigrants and refugees in the field of data science.
- Reviewed code contributions in scikit-image and performed library maintenance.

Tools: Python and its scientific ecosystem (numpy, scipy, matplotlib, scikit-image, pandas, among others), Keras, TensorFlow, fastai, git.
Funded in part by the Gordon and Betty Moore Foundation (grant # GBMF3834) and by the Alfred P. Sloan Foundation (grant # 2013-10-27).

TU Bergakademie Freiberg, Germany 2016 – 2017

Postdoctoral researcher at the Institute für Geologie.

- Studied the fission-track counting issue (Geology and Geophysics) on optical microscopy images from muscovite and diallyl-pthalate.
- Developed algorithms for filtering, segmentation, skeletonization, watershed transforms, among others.

Tools: Python, matplotlib, scikit-image.
Funded by FAPESP – São Paulo Research Foundation (grant # 2015/24582-4).

Unicamp – University of Campinas, Brazil 2015 – 2019

Postdoctoral researcher at the Department of Cosmic Rays and Chronology.

- Studied the fission-track counting issue (Geology and Geophysics) on optical microscopy images from apatite.
- Created pytracks — the first open source package with algorithms to process fission-track images.

Tools: Python, matplotlib, scikit-image.
Funded by FAPESP — São Paulo Research Foundation (grant # 2014/22922-0).

EDUCATION

UNESP — Univ Estadual Paulista, Brazil 2011 — 2015

Doctoral degree of Materials Science and Technology.

- Created algorithms to separate and process regions of interest in images from optical and electronic microscopes.

Tools: MATLAB, GNU Octave, R.
Funded by FAPESP — São Paulo Research Foundation (grant # 2011/09438-3).

UNESP — Univ Estadual Paulista, Brazil 2009 — 2011

Master degree of Materials Science and Technology.

- Characterized surfaces of materials using images from scanning electron microscopy and Fourier, Gabor and wavelet transforms.
- Developed and registered the software *WaveFPR — Wavelets and Fourier Transforms for Pattern Recognition*.

Tools: MATLAB, GNU Octave.
Funded by FAPESP — São Paulo Research Foundation (grant # 2009/04962-6).

UNESP — Univ Estadual Paulista, Brazil 2004 — 2007

Licentiate degree in Mathematics.

- Used active contours to separate and process regions of interest in cancer and muscle fiber microscopies.
- Developed and registered the software *ActiCon — Active Contours*.

Tools: MATLAB.
Funded by CNPq — National Council for Technological and Scientific Development.

PREPRINTS AND PUBLICATIONS

1. Wilson, **de Siqueira** et al. *Applying computer vision to digitised natural history collections for climate change research: temperature-size responses in British butterflies.* Methods in Ecology and Evolution, 2022. [doi:10.1111/2041-210X.13844][source code]
2. Tokojima Machado et al. *It-who-must-not-be-named: Covid-19 misinformation, tactics to profit from it and to evade content moderation on YouTube.* Preprint, 2021. [socarxiv:10.31235/osf.io/3cg9d]
3. Hunter-Zinck et al. *Ten simple rules on writing clean and reliable open-source scientific software.* PLoS Comput Biol, 2021, 17(11): e1009481. [doi:10.1371/journal.pcbi.1009481]
4. **de Siqueira** et al. *A reusable pipeline for large-scale fiber segmentation on unidirectional fiber beds using fully convolutional neural networks.* Scientific Data, 2022, 9(32). [doi:10.1038/s41597-022-01119-6][data]

5. Tokojima Machado et al. *Natural stings: selling distrust about vaccines on Brazilian YouTube.* Frontiers in Communication, 2020, 5; 91. [doi:10.3389/fcomm.2020.577941][data]
6. **de Siqueira** et al. *Skeletracks: automatic separation of overlapping fission tracks in apatite and muscovite using image processing*. Preprint. [arXiv:1806.05199][source code]
7. **de Siqueira** et al. *Segmentation of nearly isotropic overlapped tracks in photomicrographs using successive erosions as watershed markers*. Microscopy Research and Technique, 2019, 82(10); 1706-1719. [doi:10.1002/jemt.23336][source code]
8. **de Siqueira** et al. *Jansen-MIDAS: A multi-level photomicrograph segmentation software based on isotropic undecimated wavelets*. Microscopy Research and Technique, 2018, 81(1); 22-32. [doi:10.1002/jemt.22952][source code]
9. **de Siqueira** *Octave: Seus primeiros passos na programação científica*. Casa do Código, 2015. ISBN: 9788555191237. [source code]
10. **de Siqueira** et al. *Estimating the concentration of gold nanoparticles incorporated on Natural Rubber membranes using Multi-Level Starlet Optimal Segmentation*. Journal of Nanoparticle Research, 2014, 16; 2809. [doi:10.1007/s11051-014-2809-0]
11. **de Siqueira** et al. *An automatic method for segmentation of fission tracks in epidote crystal photomicrographs*. Computers and Geosciences, 2014, 69; 55-61. [doi:10.1016/j.cageo.2014.04.008][source code]
12. **de Siqueira** et al. *Segmentation of scanning electron microscopy images from natural rubber samples with gold nanoparticles using starlet wavelets*. Microscopy Research and Technique, 2014, 77(1); 71-78. [doi:10.1002/jemt.22314]

TUTORIALS (nonextensive)

1. **de Siqueira, A.F.** *3D image processing with scikit-image*. EuroSciPy, 2019. [source code]
2. **de Siqueira, A.F.** *Matplotlib*. EuroSciPy, 2018. [source code]
3. **de Siqueira, A.F.** *Image Processing using Python*. IAMG, 2017. [source code]
4. **de Siqueira, A.F.** *MATLAB Hands-on*. Research Data Visualization Workshop, University of Manchester, 2016. [source code]
5. **de Siqueira, A.F.** *MATLAB & GNU Octave: reference guide*. TU Bergakademie Freiberg, 2016. [source code]
6. **de Siqueira, A.F.** *Python Científico para Análise de Dados*. Python Brasil [11], 2015. [source code]
7. **de Siqueira, A.F.** *MATLAB & GNU Octave: guia de referência*. Ramo Estudantil IEEE, University of Campinas, 2015. [source code]
8. **de Siqueira, A.F.** *Construindo Interfaces Gráficas com o MATLAB*. V SMAT, UNESP – Univ Estadual Paulista, 2010. [source code]

OTHER PROJECTS

Open source communities 2016 – current

Commits to other open source projects.

- Some projects: arrow, napari, numpy, scikit-learn, scipy, swcarpentry.

Python Software Foundation 2017 – current

Member of the Scientific Python Working Group.

- The SWG grant funds to scientific Python conferences, user groups, educational, and development efforts.

The Carpentries 2020 – current

Certified Carpentries instructor.