

# ERALDO RIBEIRO

Florida Institute of Technology • Department of Computer Science • Melbourne, FL, USA

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## EDUCATION

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**University of York**, England, UK

Ph.D. in Computer Science, 2001

Dissertation: *Spectral Methods for Shape-from-Texture*. Advisor: Edwin R. Hancock.

**Federal University of São Carlos (UFSCar)**, São Paulo, Brazil

M.Sc. in Computer Science, 1995

Thesis: *A Spectral Approach for the Analysis of Microscopic Images*. Advisor: Paulo Estêvão Cruvinel.

**Catholic University of Salvador (UCSal)**, Salvador, Brazil

B.Sc. in Mathematics, 1992

## RESEARCH INTERESTS

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Computer Vision, Machine Learning, Artificial Intelligence, Data Science, Shape and Texture Analysis, 3-D Geometry and Visual Perception, Image Registration, Motion and Activity Recognition, Object Tracking, Deep Learning and Model Compression, Bioacoustics and Scientific Imaging, Environmental Image Analysis, Complex Networks.

## RESEARCH GRANTS

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- ◇ Computer Vision Methods for Enhancing Slosh Videos  
PI: **E. Ribeiro**. Funded by NASA, 2024–2025, \$94,000.
- ◇ Passenger Identification and Emotion Estimation  
PI: **E. Ribeiro**. Funded by Embraer, Inc., 2019–2021, \$150,000.
- ◇ Development of App and Web Interface for Automated Anuran Recognition and Mapping  
PI: **E. Ribeiro**. Funded by the U.S. National Science Foundation (NSF), 2012–2017, \$360,000.
- ◇ Image-Based Characterization of Marine Fouling  
PI: **E. Ribeiro**. Funded by the U.S. Office of Naval Research (ONR), 2006–2009, \$250,000.
- ◇ Image-Based Detection of Barnacles  
PI: **E. Ribeiro**. Funded by the U.S. Office of Naval Research (ONR), 2005–2006, \$60,000.
- ◇ Computer Vision Methods for Nanoscale Imaging  
PI: **E. Ribeiro**. Funded by the University of Central Florida (UCF), 2004, \$11,000.

## PUBLICATIONS

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### JOURNAL ARTICLES

- ◇ Estimating annual ambient air pollution using structural properties of road networks  
L. Berrisfeld, **E. Ribeiro**. *Environment and Planning B: Urban Analytics and City Science* 51(9), 2024.
- ◇ ReScape: transforming coral-reefscape images for quantitative analysis  
Z. Ferris, **E. Ribeiro**. *Scientific Reports* 14(1):8915, 2024.

- ◇ Underwater video mosaicing using topology and superpixel-based pairwise stitching  
Y. Li, C. J. Randall, R. van Woesik, **E. Ribeiro**. *Expert Systems with Applications* 119, 2019.
- ◇ Spatio-temporal variations in the urban rhythm: the travelling waves of crime  
M. Oliveira, **E. Ribeiro**. *EPJ Data Science* 7(1):29, 2018.
- ◇ A variational approach to non-rigid image registration with Bregman divergences and multiple features  
D. P. L. Ferreira, **E. Ribeiro**. *Pattern Recognition* 77, 2018.
- ◇ A combined method for segmentation and registration for an advanced and progressive evaluation of thermal images  
E. Z. Barcelos, W. M. Caminhas, **E. Ribeiro**. *Sensors* 14(11), 2014.
- ◇ Incremental variations of image moments for nonlinear image registration  
W. Liu, **E. Ribeiro**. *Signal, Image and Video Processing* 8(3), 2014.
- ◇ Procedural 3D caves, clouds and architecture generation method based on shape grammar and morphing  
T. Zawadzki, S. Nikiel, **E. Ribeiro**. *GSTF Journal on Computing* 3(1), 2013.
- ◇ Detecting singular patterns in 2D vector fields using weighted Laurent polynomial  
W. Liu, **E. Ribeiro**. *Pattern Recognition* 45(11), 2012.
- ◇ A survey on image-based continuum-body motion estimation  
W. Liu, **E. Ribeiro**. *Image and Vision Computing* 29(8), 2011.
- ◇ Robust sequence alignment for actor-object interaction recognition: discovering actor-object states  
R. Filipovych, **E. Ribeiro**. *Computer Vision and Image Understanding* 115(2), 2011.
- ◇ Automated image-based method for laboratory screening of coating libraries for adhesion of algae and bacterial biofilms  
**E. Ribeiro**. *Journal of Combinatorial Chemistry* 10(4), 2008.
- ◇ Laboratory screening of coating libraries for algal adhesion  
F. Casse, **E. Ribeiro**. *Biofouling* 23(4), 2007.
- ◇ Computer vision for nanoscale imaging  
**E. Ribeiro**. *Machine Vision and Applications* 17(3), 2006.
- ◇ Shape from periodic texture using the eigenvectors of local affine distortion  
**E. Ribeiro**. *IEEE Transactions on Pattern Analysis and Machine Intelligence* 23(12), 2002.
- ◇ Estimating the perspective pose of texture planes using spectral analysis on the unit sphere  
**E. Ribeiro**. *Pattern Recognition* 35(10), 2002.
- ◇ Detecting multiple texture planes using local spectral distortion  
**E. Ribeiro**. *Image and Vision Computing* 20(9-10), 2002.
- ◇ Improved orientation estimation for texture planes using multiple vanishing points  
**E. Ribeiro**. *Pattern Recognition* 33(10), 2000.
- ◇ Estimating the 3D orientation of texture planes using local spectral analysis  
**E. Ribeiro**. *Image and Vision Computing* 18(8), 2000.

#### PEER-REVIEWED CONFERENCES AND WORKSHOPS

- ◇ Using Vector Fields in the Modelling of Movements as Flows: A Case Study with Cattle Trade Networks  
S. Farokhnejad, M. Oliveira, **E. Ribeiro**. *Complex Networks XIV (International Workshop on Complex*

*Networks*), 2023.

- ◇ Deep topological embedding with convolutional neural networks for complex network classification  
L. Scabini, L. Ribas, **E. Ribeiro**. *International Conference on Network Science (NetSci-X)*, 2022.
- ◇ Combining weight pruning and knowledge distillation for CNN compression  
N. Aghli, **E. Ribeiro**. *IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, 2021.
- ◇ A data-driven approach to improve 3D head-pose estimation  
N. Aghli, **E. Ribeiro**. *International Symposium on Visual Computing (ISVC)*, 2021.
- ◇ A longitudinal analysis of vocabulary changes in social media  
H. Hamoodat, F. Aswad, **E. Ribeiro**. *Complex Networks XI*, 2020.
- ◇ Communities of human migration in social media: an experiment in social sensing  
F. Aswad, H. Hamoodat, **E. Ribeiro**. *Complex Networks XI*, 2020.
- ◇ A data-driven network approach for characterization of political parties' ideology dynamics  
J. Faustino, H. Barbosa, **E. Ribeiro**. *Applied Network Science* 4(1):48, 2019.
- ◇ Social media vocabulary reveals education attainment of populations  
H. Hamoodat, **E. Ribeiro**. *International Workshop on Complex Networks*, 2019.
- ◇ Sequential recognition of pollen grain Z-stacks by combining CNN and RNN  
A. Daood, **E. Ribeiro**. *FLAIRS Conference*, 2018.
- ◇ Using neural networks to include semantic information into classification  
**E. Ribeiro**. *FLAIRS Conference*, 2018.
- ◇ Variational nonrigid registration with Bregman divergences  
D. P. L. Ferreira, **E. Ribeiro**. *ACM Symposium on Applied Computing (SAC)*, 2017.
- ◇ Anuran call classification with deep learning  
J. Strout, B. Rogan, S. M. M. Seyednezhad, K. Smart, M. Bush, **E. Ribeiro**. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2017.
- ◇ Automated robust Anuran classification by extracting elliptical feature pairs from audio spectrograms  
M. Tomasini, K. Smart, R. Menezes, M. Bush, **E. Ribeiro**. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2017.
- ◇ Classifying pollen using robust sequence alignment of sparse Z-stack volumes  
A. Daood, **E. Ribeiro**. *International Symposium on Visual Computing (ISVC)*, 2016.
- ◇ Pollen grain recognition using deep learning  
A. Daood, **E. Ribeiro**. *International Symposium on Visual Computing (ISVC)*, 2016.
- ◇ Pollen recognition using a multi-layer hierarchical classifier  
A. Daood, **E. Ribeiro**. *International Conference on Pattern Recognition (ICPR)*, 2016.
- ◇ Object-aware tracking  
I. Bogun, **E. Ribeiro**. *International Conference on Pattern Recognition (ICPR)*, 2016.
- ◇ Pollen recognition in optical microscopy by matching multifocal image sequences  
R. Filipovych, A. Daood, **E. Ribeiro**. *International Conference on Pattern Recognition (ICPR)*, 2016.
- ◇ Characterization of football supporters from Twitter conversations  
D. F. Pacheco, D. Pinheiro, F. B. de Lima-Neto, **E. Ribeiro**. *IEEE/WIC/ACM International Conference on Web Intelligence (WI)*, 2016.

- ◇ RobStruck: improving occlusion handling of structured tracking-by-detection using robust Kalman filter  
I. Bogun, **E. Ribeiro**. *IEEE International Conference on Image Processing (ICIP)*, 2016.
- ◇ Discovering spatio-temporal relationships among activities in videos using a relational topic-transition model  
D. Kular, **E. Ribeiro**. *FLAIRS Conference*, 2016.
- ◇ MBestStruck: M-best diverse sampling for structured tracker  
I. Bogun, **E. Ribeiro**. *British Machine Vision Conference (BMVC)*, 2016.
- ◇ Pollen recognition using multi-layer feature decomposition  
A. Daood, **E. Ribeiro**. *FLAIRS Conference*, 2016.
- ◇ Classifying frog calls using Gaussian mixture models  
D. Kular, K. Hollowood, O. Ommojar, K. Smart, M. Bush, **E. Ribeiro**. *International Symposium on Visual Computing (ISVC)*, 2015.
- ◇ Analyzing activities in videos using latent Dirichlet allocation and Granger causality  
D. Kular, **E. Ribeiro**. *International Symposium on Visual Computing (ISVC)*, 2015.
- ◇ The Visual Object Tracking VOT2015 challenge results  
M. Kristan, J. Matas, A. Leonardis, M. Felsberg, et al. (incl. **E. Ribeiro**). *IEEE International Conference on Computer Vision Workshops (ICCVW)*, 2015.
- ◇ Interaction recognition using sparse portraits  
I. Bogun, H. Khan, J. Chen, **E. Ribeiro**. *International Conference on Pattern Recognition (ICPR)*, 2014.
- ◇ Human action recognition using temporal sequence alignment  
S. Almotairi, **E. Ribeiro**. *International Conference on Computational Science and Computational Intelligence (CSCI)*, 2014.
- ◇ Action classification using sequence alignment and shape context  
S. Almotairi, **E. Ribeiro**. *FLAIRS Conference*, 2014.
- ◇ Recognizing human-object interactions using sparse subspace clustering  
I. Bogun, **E. Ribeiro**. *International Conference on Computer Analysis of Images and Patterns (CAIP)*, 2013.
- ◇ 3-D mesh-classification method based on angular histograms  
T. Zawadzki, S. Nikiel, **E. Ribeiro**. *International Conference on Computer Graphics, Visualization and Computer Vision (WSCG)*, 2013.
- ◇ A network-centric epidemic approach for automated image label annotation  
M. Bohlool, R. Menezes, **E. Ribeiro**. *International Workshop on Complex Networks (CompleNet)*, 2011.
- ◇ A higher-order model for fluid motion estimation  
W. Liu, **E. Ribeiro**. *International Conference on Image Analysis and Recognition (ICIAR)*, 2011.
- ◇ Using network analysis to understand the relation between cuisine and culture  
D. K. Kular, R. Menezes, **E. Ribeiro**. *IEEE Network Science Workshop*, 2011.
- ◇ A meshless method for variational nonrigid 2-D shape registration  
W. Liu, **E. Ribeiro**. *International Symposium on Visual Computing (ISVC)*, 2010.
- ◇ A novel consistency regularizer for meshless nonrigid image registration  
W. Liu, **E. Ribeiro**. *International Symposium on Visual Computing (ISVC)*, 2010.

- ◇ Estimating nonrigid shape deformation using moments  
W. Liu, **E. Ribeiro**. *International Conference on Pattern Recognition (ICPR)*, 2010.
- ◇ Scale and rotation invariant detection of singular patterns in vector flow fields  
W. Liu, **E. Ribeiro**. *IAPR Workshops on Structural, Syntactic, and Statistical Pattern Recognition (S+SSPR)*, 2010.
- ◇ Adaptive tuboid shapes for action recognition  
R. Filipovych, **E. Ribeiro**. *International Symposium on Visual Computing (ISVC)*, 2009.
- ◇ Determining the scale of interest regions in videos  
R. Filipovych, **E. Ribeiro**. *IEEE International Conference on Image Processing (ICIP)*, 2009.
- ◇ Learning structural models in multiple projection spaces  
R. Filipovych, **E. Ribeiro**. *International Conference on Image Analysis and Recognition (ICIAR)*, 2009.
- ◇ Discovering constrained substructures in Bayesian trees using the EM algorithm  
R. Filipovych, **E. Ribeiro**. *International Conference on Image Analysis and Recognition (ICIAR)*, 2008.
- ◇ Learning human motion models from unsegmented videos  
R. Filipovych, **E. Ribeiro**. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2008.
- ◇ Recognizing primitive interactions by exploring actor-object states  
R. Filipovych, **E. Ribeiro**. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2008.
- ◇ Probabilistic combination of visual cues for object classification  
R. Filipovych, **E. Ribeiro**. *International Symposium on Visual Computing (ISVC)*, 2007.
- ◇ Combining models of pose and dynamics for human motion recognition  
R. Filipovych, **E. Ribeiro**. *International Symposium on Visual Computing (ISVC)*, 2007.
- ◇ Human motion recognition using Isomap and dynamic time warping  
J. Blackburn, **E. Ribeiro**. *Workshop on Human Motion (ICCV)*, 2007.
- ◇ Learning repetitive patterns for classifying non-rigidly deforming texture surfaces  
R. Filipovych, **E. Ribeiro**. *International Conference on Image Analysis and Processing (ICIAP)*, 2007.
- ◇ Learning basic patterns from repetitive texture surfaces under non-rigid deformations  
R. Filipovych, **E. Ribeiro**. *International Conference on Image Analysis and Recognition (ICIAR)*, 2007.
- ◇ Coral reef texture classification using support vector machines  
A. Mehta, **E. Ribeiro**. *International Conference on Computer Vision Theory and Applications (VISAPP)*, 2007.
- ◇ Viewing scenes occluded by smoke  
A. Donate, **E. Ribeiro**. *International Symposium on Visual Computing (ISVC)*, 2006.
- ◇ Classification of textures distorted by water waves  
A. Donate, G. Dahme, **E. Ribeiro**. *International Conference on Pattern Recognition (ICPR)*, 2006.
- ◇ Improved reconstruction of images distorted by water waves  
A. Donate, **E. Ribeiro**. *International Conference on Computer Vision Theory and Applications (VISAPP)*, 2006.
- ◇ Spatial statistics of textons  
G. Dahme, **E. Ribeiro**. *International Conference on Computer Vision Theory and Applications (VISAPP)*, 2006.
- ◇ Eigenvector method for texture recognition

- M. Carcassoni, **E. Ribeiro**. *IEEE International Conference on Image Processing (ICIP)*, 2002.
- ◇ An evidence combining approach to shape-from-shading  
**E. Ribeiro**. *International Conference on Pattern Recognition (ICPR)*, 2002.
  - ◇ Texture recognition through modal analysis of spectral peak patterns  
M. Carcassoni, **E. Ribeiro**. *International Conference on Pattern Recognition (ICPR)*, 2002.
  - ◇ Analysis of curved textured surfaces using local spectral distortion  
**E. Ribeiro**. *International Conference on Advances in Pattern Recognition (ICAPR)*, 2001.
  - ◇ Shape-from-texture from eigenvectors of spectral distortion  
**E. Ribeiro**. *The Mathematics of Surfaces IX*, 2000.
  - ◇ Adapting spectral scale for shape from texture  
**E. Ribeiro**. *European Conference on Computer Vision (ECCV)*, 2000.
  - ◇ Perspective pose from spectral voting  
**E. Ribeiro**. *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2000.
  - ◇ An eigendecomposition method for shape-from-texture  
**E. Ribeiro**. *International Conference on Pattern Recognition (ICPR)*, 2000.
  - ◇ Texture plane orientation from spectral accumulation  
**E. Ribeiro**. *International Conference on Pattern Recognition (ICPR)*, 2000.
  - ◇ A scale adaptive method for focusing spectral peaks  
**E. Ribeiro**. *International Conference on Pattern Recognition (ICPR)*, 2000.
  - ◇ Curvature estimation using shape-from-texture  
**E. Ribeiro**. *IAPR Workshops on Statistical Techniques in Pattern Recognition (SSPR)*, 2000.
  - ◇ Improved pose estimation for texture planes using multiple vanishing points  
**E. Ribeiro**. *IEEE International Conference on Image Processing (ICIP)*, 1999.
  - ◇ A scale adaptive method for estimating the perspective pose of texture planes  
**E. Ribeiro**. *Brazilian Symposium on Computer Graphics and Image Processing (SIBGRAPI)*, 1999.

#### BOOK CHAPTERS

- ◇ Fast structured tracker with improved motion model using robust Kalman filter  
I. Bogun, **E. Ribeiro**. *Handbook of Pattern Recognition and Computer Vision*, 2016.
- ◇ Nonrigid image registration using moments  
W. Liu, **E. Ribeiro**. *Emerging Topics in Computer Vision and Its Applications*, 2012.

#### WORK EXPERIENCE

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##### ACADEMIC

##### **Associate Professor of Computer Science**

Florida Institute of Technology, Melbourne, FL, USA 2009 – Present

##### **Assistant Professor of Computer Science**

Florida Institute of Technology, Melbourne, FL, USA 2003 – 2009

##### **Research Associate**

University of York, England, UK 2000 – 2001

## INDUSTRY

### Computer Vision Consultant

SiteScape, Inc., Remote, USA

2021 – 2022

### Computer Vision Software Engineer

Vicon Motion Systems, Oxford, UK

2001 – 2002

## TEACHING

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### GRADUATE COURSES

- ◇ CSE 5683 — Computer Vision
- ◇ CSE 5280 — Computer Graphics Algorithms

### UNDERGRADUATE COURSES

- ◇ CSE 2010 — Data Structures and Algorithms
- ◇ CSE 2050 — Programming in a Second Language (C++)
- ◇ CSE 4001 — Operating Systems Concepts

## STUDENT SUPERVISION

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### CURRENT PH.D. STUDENTS

- ◇ **Mahbuba Perveen** — *Indoor Layout Estimation*. TBD.

### GRADUATED PH.D. STUDENTS

- ◇ **Katrina Smart** — *Automatic Identification of Anuran Species from Acoustic Signals*. Graduated Summer 2018. Scientist at ENSCO, Inc., Melbourne, FL, USA.
- ◇ **Yan Li** — *Underwater Video Mosaicking and Image Classification of Coral-Reef Colonies*. Graduated Spring 2018.
- ◇ **Amar Daood** — *Pollen Classification Using Deep Learning Approaches*. Graduated Fall 2017.
- ◇ **Darwinderjeet Kular** — *Analyzing Motion Patterns and Behaviors of Human Activity*. Graduated Fall 2015. Senior Research Scientist at Raytheon, Melbourne, FL, USA.
- ◇ **Ivan Bogun** — *Tracking and Recognition of Human–Object Interactions Using Information from Sparse Subspaces*. Graduated Spring 2015. Software Engineer at Waymo, USA.
- ◇ **Sultan Almotairi** — *Human Action Recognition Using Manifold Learning*. Graduated Fall 2014. Associate Professor and Dean of the Community College, Majmaah University, Saudi Arabia.
- ◇ **Wei Liu** — *Polynomial Models in Nonrigid Motion Estimation and Analysis*. Graduated Spring 2011. Commonwealth Bank, Sydney, Australia.
- ◇ **Roman Filipovych** — *Learning the Spatial Structure of Motion Patterns for Tracking and Recognition*. Graduated Fall 2009. Microsoft.com, WA, USA.

## GRADUATED M.SC. (THESIS) STUDENTS

- ◇ **Qinxin Fu** — *Interpolation of 2-D Vector Fields*. Graduated Fall 2015.
- ◇ **Weisi Ding** — *3-D Shape and Image Registration Using Image Moments*. Graduated Spring 2012. Automation Engineer at Wilbur-Ellis, WA, USA.
- ◇ **Miles Wallio** — *Tracking Nonrigid Surface Deformations*. Graduated Spring 2012. Microsoft, WA, USA.
- ◇ **Faisal Badughaish** — *Seismic Data Analysis*. Graduated Spring 2011. Saudi Aramco, Saudi Arabia.
- ◇ **Jaron Blackburn** — *Manifold Learning and Motion-Pattern Matching*. Graduated Fall 2008. Harris Corporation, USA.
- ◇ **Arturo Donate** — *Reconstructing Dynamic Scenes*. Graduated Summer 2006. Booz Allen Hamilton, USA.

## PROFESSIONAL SERVICE

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### JOURNAL EDITORIAL BOARDS

- ◇ Associate Editor, *Pattern Recognition* (Elsevier), since 2019.
- ◇ Associate Editor, *Signal, Image and Video Processing* (Springer), since 2013.
- ◇ Associate Editor, *Machine Vision and Applications* (Springer), since 2005.

### GRANT-PROPOSAL REVIEW

- ◇ U.S. National Science Foundation (NSF) review panel, Computer Vision — 2004, 2005, 2008.
- ◇ Frequent reviewer of grant proposals for the Czech Science Foundation (GAČR).

### JOURNAL REVIEWING

Frequent reviewer for *IEEE Transactions on Image Processing*; *IEEE Transactions on Geoscience and Remote Sensing*; *IEEE Transactions on Systems, Man, and Cybernetics*; *IEEE Signal Processing Letters*; *Machine Vision and Applications*; *Computer Vision and Image Understanding*; and *Pattern Recognition*.

### CONFERENCE REVIEWING

Frequent reviewer for IEEE ICIP, IAPR ICPR, IAPR ICIAP, IAPR DICTA, the International Symposium on Visual Computing (ISVC), and ICIAR.

## REFERENCES

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Available upon request.