

**Companion Proceedings of the  
32<sup>nd</sup> SIBGRAPI – Conference on Graphics, Patterns  
and Images**



# **SIBGRAPI 2019**

**32nd Conference on Graphics, Patterns and Images SIBGRAPI 2019**

**October 28th to 31st | Rio**

**Workshop of Theses and Dissertations (WTD)  
Workshop of Works in Progress (WiP)  
Workshop of Undergraduate Works (WUW)  
Workshop of Industry Applications (WIA)**

# **SIBGRAPI'19**

**32nd Conference on Graphics, Patterns and Images**

**Rio de Janeiro – RJ**

## **Companion Proceedings of the 32<sup>nd</sup> SIBGRAPI – Conference on Graphics, Patterns and Images**

**Workshop of Theses and Dissertations (WTD)**

**Workshop of Works in Progress (WiP)**

**Workshop of Undergraduate Works (WUW)**

**Workshop of Industry Applications (WIA)**

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## MESSAGE FROM THE GENERAL CHAIRS

Welcome to the 32<sup>nd</sup> edition of SIBGRAPI – Conference on Graphics, Patterns and Images. In 2019, SIBGRAPI will take place in Rio de Janeiro-RJ, Brazil at CINCO - Riocentro Convention and Event Center.

SIBGRAPI is one of the most traditional conferences in Latin America, bringing together students, researchers and professionals in the areas of image processing, pattern recognition, computer vision, computer graphics and visualization. Sibgrapi 2019 will be co-located with two other major events: SBGames 2019, the Symposium on Computer Games and Digital Entertainment, and SVR 2019, the Symposium on Virtual and Augmented Reality.

The Brazilian Computer Society (SBC) promotes the conference, which is held in-cooperation with ACM SIGGRAPH. The 32<sup>nd</sup> edition of SIBGRAPI is being organized by the Pontifical Catholic University of Rio de Janeiro and Fluminense Federal University.

We are grateful to all the volunteers, invited speakers, program chairs, tutorial chairs, workshop chairs, authors, sponsors, and participants for their valuable contributions. We would also like to thank CAPES, CNPQ, FAPERJ, SBC, PUC-Rio, TECGRAF, NVIDIA, Secretária da Cultura de Niterói, FIRJAN SENAI and ONRG for their support from.

Welcome to SIBGRAPI 2019!

*Sinesio Pesco, Hélio Lopes and Alex Laier*  
**SIBGRAPI 2019 General Chairs**

# MESSAGE FROM THE PROGRAM CHAIRS

SIBGRAPI 2019 - Conference on Graphics, Patterns, and Images, is an international venue annually promoted by the Brazilian Computer Society (SBC). The proceedings of the event have been published by the IEEE Computer Society Press since 1997. In addition, SIBGRAPI 2019 includes two special tracks whose proceedings are published as a Special Section in Elsevier's Computers & Graphics Journal and as a Special Stream in IEEE's Geoscience and Remote Sensing Letters.

This year, SIBGRAPI features a technical program including 35 full papers published in the conference proceedings (by IEEE CS Press), 12 full papers published in the Computers & Graphics journal track, and 7 full papers published in IEEE's Geoscience and Remote Sensing Letters journal track.

Each submission received three or more reviews from members of the Program Committee to ensure high standards of quality. The papers published in the conference proceedings underwent a one-stage double-blind review process, while the ones published in Elsevier's Computers & Graphics journal track and IEEE's Geoscience and Remote Sensing Letters journal track underwent up to three stages of double-blind reviewing.

All 54 papers are presented orally at the conference, grouped into 10 thematic sessions. Five outstanding keynote speakers enrich the SIBGRAPI 2019 program: Ken Perlin (New York University), Filip Sadlo (Heidelberg University), João P. Barreto (UC, Portugal), Carla Dal Sasso Freitas (UFRGS), and Soraia Raupp Musse (PUCRS).

In addition, SIBGRAPI 2019 also hosts the following events:

- Workshop of Theses and Dissertations;
- Workshop of Undergraduate Works;
- Works in Progress;
- Workshop of Industry Applications;
- 8th Workshop on Visual Analytics, Information Visualization and Scientific Visualization;

and four tutorials:

- Deep Learning for Computer Vision in GPUs: an introductory hands-on tutorial;
- Milestones and New Frontiers in Deep Learning;
- Hands-On Transfer Learning with Keras;
- A Hands-on Tutorial on Fast Forwarding First-Person Video.

The SIBGRAPI 2019 Program Chairs wish to acknowledge all the people who contributed to the successful organization of the program: Sinésio Pesco (Conference Chair, PUC-Rio), Hélio Lopes (Conference Chair, PUC-Rio), and Alex Laier (Conference Chair, UFF). We acknowledge Cristina Ceballos, IEEE

Computer Society, editor of the conference proceedings and all the IEEE Computer Society team. Also the continuous support of Joaquim Jorge, Editor-in-Chief of Computers & Graphics, and all Elsevier team members, as well as, Avik Bhattacharya, Editor-in-Chief of IEEE Geoscience and Remote Sensing Letters, and the Guest Editors: Luciano Oliveira, Paulo Gamba, Nelson Mascarenhas, Jefersson Santos, and Hélio Lopes. We are grateful to all members of the Program Committee for their hard work in the reviewing process.

SIBGRAPI 2019 is held in-cooperation with ACM/SIGGRAPH, received financial sponsorship from SBC, PUC-Rio, TECGRAF, NVIDIA, Secretária da Cultura de Niterói and FIRJAN SENAI and is supported by CAPES, CNPq, FAPERJ and ONRG.

*Marcos Lage, Luciano Oliveira, Filip Sadlo, Pinaki Sarder*  
**SIBGRAPI 2019 Program Chairs**

## **MESSAGE FROM THE WORKSHOP OF THESES AND DISSERTATIONS CHAIRS**

The Workshop of Theses and Dissertations (WTD) is a venue for publishing condensed papers of theses and dissertations concluded in the last year.

The workshop aims to advertise the works and also motivate discussions around the graduate-level research related to the topics covered by SIBGRAPI.

This year, we received 23 submissions. Each paper has been evaluated by two different reviewers and, in the end, disregarding the withdrawn papers, a total of 20 works are being presented in poster sessions and included in the electronic proceedings.

We would like to thank the authors for their contribution, and the reviewers for their effort and dedication. Also, we would like to congratulate the local organizing committee and the program committee for their hard work to make this event possible.

*Carla Dal Sasso Freitas and Mauricio Pamplona Segundo*  
**SIBGRAPI 2019 WTD Chairs**



## **MESSAGE FROM THE WORKSHOP OF WORKS IN PROGRESS CHAIRS**

The Workshop of Works in Progress (WiP) is a forum for discussing ongoing research, development projects, issues on transferring research to industrial applications and general technical information and ideas in all areas of Computer Graphics, Image Processing, Pattern Recognition, and Computer Vision.

This year, we have received 12 ongoing studies, written in Portuguese or English. From those, after a very careful reviewing cycle, a total of 11 papers have been selected to be presented in a digital poster session. All submissions have been reviewed, double-blindly, by three different reviewers.

We congratulate the authors for their contribution in maintaining the high scientific level of this track through the submission of such high-quality research works. Reviewers also play a fundamental role for their effort and voluntary work in maintaining high scientific standards. Last, but not least, we would like to congratulate the local organizing committee and the program committee for the excellent work in leading the SIBGRAPI 2019 activities.

We look forward to seeing you at the Workshop of Works in Progress and wish a very talkative and productive day to all attendees!

*Danilo Coimbra and Lis Custodio*  
**SIBGRAPI 2019 WiP Chairs**

## **MESSAGE FROM THE WORKSHOP OF UNDERGRADUATE WORKS CHAIRS**

The main goals of the Workshop of Undergraduate Works (WUW) are to motivate undergraduate students involved in research projects on Computer Graphics, Image Processing and Computer Vision to attend the SIBGRAPI conference, and to provide opportunities and environment for these students to present and discuss their research among themselves and with experts in the area. Accepted works are included in the electronic proceedings, formatted in four-page papers and written either in Portuguese or in English.

This year, we accepted 10 out of 17 submissions for poster presentation during the SIGBRAPI-WUW. In the review phase, each paper was evaluated by at least two reviewers.

We would like to thank the authors for their contributions, and the reviewers, who dedicated their valuable time to evaluate the submitted papers. Finally, we would like to congratulate the local organizing committee and the program committee for their excellent work in leading the SIBGRAPI activities.

*Cristina Nader and Nivan Ferreira*  
**SIBGRAPI 2017 WUW Chairs**

## **MESSAGE FROM THE WORKSHOP OF INDUSTRY APPLICATIONS CHAIRS**

The Workshop of Industry Applications (WIA) welcomes submissions describing solutions based on graphics, patterns, and images for industry applied problems. Contributions are expected to feature innovative applications based on state-of-the-art methods, tools, and techniques related to interactive graphics, image processing, computer vision, visualization, and virtual reality, among other imaging modalities. Contributions are also encouraged to be the result of applied and exploratory research.

In 2019, WIA receives three invited speakers: Pablo Bioni (VFX R&D Director, TV Globo, Brazil), José Alberto Cuminato (Full Professor, USP São Carlos, Director of CeMEAI, Brazil), and Leila Fonseca (National Institute for Space Research – INPE, Brazil). The themes of the WIA lectures this year are TV special effects, fluid simulation in the aeronautics industry, and remote sensing & environmental monitoring. Also, three technical papers will be presented. This year, we are pleased to announce the introduction of a Best WIA Paper Award.

We now urge the academic and industrial research communities to attend the workshop and enjoy the discussion on practical issues of visualization and/or graphics-based approaches to applied problems.

We look forward to seeing you at WIA – SIBGRAPI 2019!

Antonio Castelo and Bruno Feijó  
**SIBGRAPI 2019 WIA Chairs**

## **Workshop of Theses and Dissertations (WTD)**

### **On the Training Algorithms for Restricted Boltzmann Machines**

*Leandro Aparecido Passos (São Paulo State University);  
João Paulo Papa (São Paulo State University)*

### **Visual Analytics via Graph Signal Processing**

*Alcebiades Dal Col (Federal University of Espirito Santo)  
Luis Gustavo Nonato (University of São Paulo)*

### **Simulating Behavior Diversity in BioCrowds**

*Paulo Knob (Pontifical Catholic University of Rio Grande do Sul);  
Soraia Raupp Musse (Pontifical Catholic University of Rio Grande do Sul)*

### **Adaptive Face Tracking Based on Online Learning**

*Aasim Khurshid (UFRGS and SIDIA);  
Jacob Scharcanski (UFRGS)*

### **FASTensor: A tensor framework for spatiotemporal description**

*Virgínia F. Mota (UFMG);  
Jefersson A. dos Santos (UFMG);  
Arnaldo de A. Araújo (UFMG)*

### **Digital Video Stabilization: Algorithms and Evaluation**

*Marcos Roberto Souza (University of Campinas);  
Helio Pedrini (University of Campinas)*

### **A Collaborative Support for Recommending References in Papers**

*Orlando Fonseca Guilarte (PUC-Rio);  
Simone Diniz Junqueira Barbosa (PUC-Rio);  
Sinesio Pesco (PUC-Rio)*

### **An Efficient Hierarchical Layered Graph Approach for Multi-Region Segmentation**

*Leissi M. Castañeda Leon (IME-USP);  
Krzysztof Chris Ciesielski (West Virginia University);  
Paulo A. Vechiatto Miranda (IME-USP)*

### **Semantic Hyperlapse: a Sparse Coding-based and Multi-Importance Approach for First-Person Videos**

*Michel M. Silva (UFMG);  
Mario F. M. Campos (UFMG);  
Erickson R. Nascimento (UFMG)*

### **Unsupervised Selective Rank Fusion on Content-Based Image Retrieval**

*Lucas Pascotti Valem (UNESP);  
Daniel Carlos Guimarães Pedronette (UNESP)*

### **Concomitant Hierarchy Construction and Rendering of Large Point Clouds**

*Vinicius Silva (IMPA);  
Ricardo Guerra Marroquim (UFRJ);  
Claudio Esperança (UFRJ)*

**Object segmentation by Oriented Image Foresting Transform with connectivity constraints**

*Lucy A. C. Mansilla (IME-USP);*

*Paulo A. V. Miranda (IME-USP)*

**Matching People Across Surveillance Cameras**

*Raphael Prates (UFMG);*

*William Robson Schwartz (UFMG)*

**Speckle Denoising With NL Filter and Stochastic Distances Under the Haar Wavelet Domain**

*Pedro A. A. Penna (UFSCar);*

*Nelson D. A. Mascarenhas (UFSCar, UNIFACCAMP)*

**Emotion, Personality and Cultural Aspects in Crowds: towards a Geometrical Mind**

*Rodolfo Migon Favaretto (Pontifical Catholic University of Rio Grande do Sul);*

*Soraia Raupp Musse (Pontifical Catholic University of Rio Grande do Sul)*

**Multimodal social scenario perception model for initial human-robot interaction**

*Diego Cardoso Alves (University of Campinas);*

*Paula Dornhofer Paro Costa (University of Campinas)*

**Human Activity Recognition based on Wearable Sensors using Multiscale DCNN Ensemble**

*Jessica Sena (UFMG);*

*William Robson Schwartz (UFMG)*

**Evaluation of machine learning applied to the realignment of hierarchies for image segmentation**

*Milena Menezes Adão (Pontifical Catholic University of Minas Gerais);*

*Silvio Jamil F. Guimarães (Pontifical Catholic University of Minas Gerais);*

*Zenilton K. G. Patrocínio Jr. (Pontifical Catholic University of Minas Gerais)*

**Multimodal person discovery using label propagation over speaking faces graphs**

**Gabriel Barbosa Fonseca (PUC Minas);**

*Zenilton K. G. Patrocínio Jr (PUC Minas);*

*Guillaume Gravier (CNRS, IRISA);*

*Silvio Jamil F. Guimarães (PUC Minas)*

**A visual approach for user-guided feature fusion**

*Gladys M. Hilasaca (University of São Paulo ICMC-USP);*

*Fernando V. Paulovich (University of São Paulo ICMC-USP)*

## **Workshop of Works in Progress (WiP)**

### **Multiband image classification of astronomical objects**

*Ana Martinazzo (IME-USP);  
Nina Sumiko Tomita Hirata (IME-USP)*

### **Parametrização hierárquica de superfícies poligonais construída com triangulação de Delaunay restrita**

*Pablo Telles (PUC-Rio);  
Romildo Silva (UFC);  
Esdras Medeiros (UFC);  
Sinesio Pesco (PUC-Rio)*

### **Normal Transformations for Overhang Reduction**

*Carlos Leal de Castro (UFSC);  
Leonardo Koller Sacht (UFSC)*

### **Detecção de Desfolha de Soja Utilizando Redes Neurais Convolucionais**

*Patrik Olã Bressan (UFMS);  
Wesley Nunes Gonçalves (UFMS)*

### **An Approach to Classify Chronic Kidney Diseases using Scintigraphy Images**

*Elene Firmeza Ohata (IFCE);  
Francisco Hercules dos Santos Silva (IFCE);  
Shara Shami Araujo Alves (IFCE);  
Suane Pires Pinheiro da Silva (IFCE);  
Jefferson Silva Almeida (IFCE);  
Pedro Pedrosa Rebouças Filho (IFCE)*

### **Development of Embedded Algorithm for Visual Simultaneous Localization and Mapping**

*Onias Silveira (IME);  
João de Melo (IME);  
Leandro Moreira (IME);  
Luiz Rodrigues (IMBEL);  
Paulo Rosa (IME)*

### **Metodologia Adotada na Reconstrução 3D da Estação Saudade, em Ponta Grossa - PR**

*Matheus T Fratus (UTFPR);  
Mauren Louise Sguario Coelho de Andrade (UTFPR)*

### **A New Strategy for Mobile Robots Localization based on Omnidirectional Sonar Images and Machine Learning**

*Jefferson Silva Almeida (IFCE);  
Elene Firmeza Ohata (IFCE);  
Suane Pires Pinheiro da Silva (IFCE);  
Francisco Hercules dos Santos Silva (IFCE);  
Pedro Henrique Feijó de Sousa (IFCE);  
Navar Medeiros M. Nascimento (IFCE);  
Pedro Pedrosa Rebouças Filho (IFCE)*

**Object-based Method for Identifying New Constructions around Water Reservoirs:  
Preliminary Results**

*Nayereh Hamidishad (USP);*

*Roberto Cesar Junior (USP)*

*Similaridade de Imagens pela Análise da Aleatoriedade Utilizando Compressão de  
Dados*

*Rafael Divino F Feitosa (IF Goiano);*

*Anderson Soares (UFG)*

**Utilização de Redes Neurais Completamente Convolucionais para identificação e  
medição de crânios fetais**

*Everton Leonardo Skeika (UTPFR);*

*Mauren Louise Sguario Coelho de Andrade (UTPFR);*

*Hugo Valadares Siqueira (UTFPR)*

## **Workshop of Undergraduate Works (WUW)**

**Classificação da densidade mamária em mamografias utilizando redes neurais convolucionais**

*Marcos Felipe Vendramini Carvalho (PUC-Minas);  
Alexei Manso Correa Machado (UFMG)*

**Detecção e Contagem do Pirarucu utilizando Técnicas de Visão Computacional**

*Wandelany Abreu (UFOPA);  
Deam Silva (UFOPA);  
Roberto Nascimento (UFOPA);  
Josivan Reis (UFOPA);  
Márcio Ponte (UFOPA)*

**An assault detection system based on human Pose Tracking for video surveillance**

*Pedro Gabriel Santos do Couto Soares (UFRPE);  
Arnaldo Barros da Silva (UFRPE);  
Luis Filipe Alves Pereira (UFRPE)*

**Multitemporal liver analysis for surgical plan and clinical follow-up, adapted for Sibgrapi 2019**

*Rodrigo Braga dos Santos (UERJ);  
Guilherme Fontes dos Reis (UERJ);  
Gilson Alexandre Ostwald Pedro da Costa (UERJ)*

**Reconhecimento de Objetos em Linhas de Distribuição de Energia Utilizando IBM Cloud**

*Raianny Proença de Camargo de Oliveira (FPTI, UNIOESTE);  
Valéria Nunes dos Santos (FPTI);  
Cláudio Roberto Marquette Maurício (UNIOESTE)*

**Classificação de Imagens de Raio-x de Torax com Reconhecimento Visual da IBM Cloud para Diagnóstico de Pneumonia**

*Raianny Proença de Camargo de Oliveira (UNIOESTE);  
Guilherme Rodrigues Sganderla (UNIOESTE);  
Claudio Roberto Marquette Maurício (UNIOESTE);  
Fabiana Frata Furlan Peres (UNIOESTE)*

**Tecnologia assistiva para reconhecimento de cartas de baralho utilizando aprendizado profundo**

*Samuel Alves dos Santos (IF Goiano);  
Allan Duque dos Santos (IF Goiano);  
Junio Cesar de Lima (IF Goiano);  
Fabrizzio Alphonsus Alves de Melo Nunes Soares (UFG);  
Gabriel da Silva Vieira (IF Goiano)*

**Hierarchy-of-Visual-Words: a Learning-based Approach for Trademark Image Retrieval**

*Vítor Lourenço (UFF);  
Gabriela Silva (UFF);  
Leandro Fernandes (UFF)*



## Multi-Lingual Text Localization via Language-Specific Convolutional Neural Networks

*Jhonatas Santos de Jesus Conceição(UNICAMP);*

*Allan Pinto (UNICAMP);*

*Luis Decker, Jose Luis Flores Campana (UNICAMP);*

*Manuel Cordova Neira (UNICAMP);*

*Andreza A. dos Santos (UNICAMP);*

*Helio Pedrini (UNICAMP);*

*Ricardo Torres (NTNU, UNICAMP)*

## Use of reorderable matrices and heatmaps to support data analysis of students transcripts

*Rafael Tavares Carvalho Barros (UNICAMP);*

*Thiago Gonçalves Mendes (UNICAMP);*

*Celmar Guimarães da Silva (UNICAMP)*

## **Workshop of Industrial Applications (WIA)**

Uncertainty quantification in reservoir history matching using the ensemble smoother

*Thiago M. D. Silva (PUC-RIO);*

*Abelardo Barreto (PUC-RIO);*

*Sinesio Pesco (PUC-RIO)*

Improving the performance of a SVM+HOG classifier for detection and tracking of wagon components by using geometric constraints

*Camilo Lélis A. Gonçalves (UFPA);*

*Ronaldo F. Zampolo (UFPA);*

*Fabício José B. Barros (UFPA);*

*Ana Claudia S. Gomes (ISI/SENAI);*

*Eduardo C. de Carvalho (ISI/SENAI);*

*Bruno Victor M. Ferreira (ISI/SENAI);*

*Rafael L. Rocha (ISI/SENAI);*

*Rodrigo C. Rodrigues (VALE S.A);*

*Giovanni Augusto F. Dias (VALE S.A);*

*Diego A. Freitas (VALE S.A)*

Visual assessment of equirectangular images for virtual reality applications In Unity

*Adriano Gil (SVIDIA);*

*Thiago Figueira (SVIDIA);*

*Aasim Khurshid (UFRGS, SVIDIA);*

*Juliana Postal (SVIDIA)*