Daniel H. Moreira

Assistant Research Professor at the University of Notre Dame

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Education

PhD Degree
(2013 – 2016)
University of Campinas (Unicamp), Institute of Computing (IC), Campinas, SP, Brazil
Computer Science, Sensitive-Video Analysis. Advisor: Dr. Anderson Rocha / Co-advisor: Dr. Siome Goldenstein. GPA: 4.0.

MSc Degree
(2006 – 2008)
Federal University of Pernambuco (UFPE), Center of Informatics (CIn), Recife, PE, Brazil
Computer Science, Multi-Agent Patrolling. Advisor: Dr. Geber Ramalho. GPA: 4.0.

BSc Degree
(2001 – 2005)
Federal University of Pará (UFPA), Institute of Exact and Natural Sciences (ICEN), Belém, PA, Brazil
Computer Science. GPA: 3.88.

Work Experience

Assistant Research Professor
(2020 – present)
University of Notre Dame, Department of Computer Science and Engineering, and Center for Research Computing, Notre Dame, IN, USA
Researcher and Instructor (Media Forensics, Computer Vision, Machine Learning, and Biometrics).

Research Scholar
(2016 – 2020)
University of Notre Dame, Department of Computer Science and Engineering, Notre Dame, IN, USA
Computer Vision Research Laboratory (CVRL). Advisors: Drs. Walter Scheirer, Adam Czajka, and Patrick Flynn. *Postdoctoral researcher.*

Research Fellow
(2013 – 2016)
University of Campinas (Unicamp), Institute of Computing (IC), Campinas, SP, Brazil
Reasoning for Complex Data Laboratory (RECOD). Advisor: Dr. Anderson Rocha.
PhD student.

Instructor
(2012 – 2012)
Centro Universitário do Estado do Pará (CESUPA), Belém, PA, Brazil
Systems and Database Programming 40h module, within the Corporate Databases Graduate Program. Instructor.

Systems Analyst
(2009 – 2013)
Federal Data Processing Service (SERPRO), Belém, PA, Brazil
Full-stack lead developer.

Systems Analyst
(2008 – 2009)
Cobra Tecnologia S.A., Belém, PA, Brazil
Back-end programmer.

Research Fellow
(2006 – 2008)
Federal University of Pernambuco (UFPE), Recife, PE, Brazil
Center of Informatics (CIn). Advisor: Dr. Geber Ramalho.
MSc student.

Publications

Refereed Journal Articles

2022 Sara Mandelli, Davide Cozzolino, Edoardo Cannas, João Cardenuto, **Daniel Moreira**, Paolo Bestagini, Walter Scheirer, Anderson Rocha, Luisa Verdoliva, Stefano Tubaro, Edward Delp.
Forensic Analysis of Synthetically Generated Western Blot Images.
[J.1] IEEE Access 10, 1, pp. 59919 – 59932.

2021 Joel Brogan, Aparna Bharati, **Daniel Moreira**, Kevin Bowyer, Patrick Flynn, Anderson Rocha, Walter Scheirer.
Fast Local Spatial Verification for Feature-Agnostic Large-Scale Image Retrieval.
[J.2] IEEE Transactions on Image Processing (T-IP) 30, 1, pp. 6892 – 6905.

Aparna Bharati, **Daniel Moreira**, Patrick Flynn, Anderson Rocha, Kevin Bowyer, Walter Scheirer.
Transformation-Aware Embeddings for Image Provenance.
[J.3] IEEE Transactions on Information Forensics and Security (T-IFS) 16, 1, pp. 2493 – 2507.

Refereed Journal Articles (cont.)

2019   **Daniel Moreira**, Sandra Avila, Mauricio Perez, Daniel Moraes, Vanessa Testoni, Eduardo Valle, Siome Goldenstein, Anderson Rocha.
Multimodal Data Fusion for Sensitive Scene Localization.
[J.4] Elsevier Information Fusion (IF) 45, 1, pp. 307 – 323.

2018   **Daniel Moreira**, Aparna Bharati, Joel Brogan, Allan Pinto, Michael Parowski, Kevin Bowyer, Patrick Flynn, Anderson Rocha, Walter Scheirer.
Image Provenance Analysis at Scale.
[J.5] IEEE Transactions on Image Processing (T-IP) 27, 12, pp. 6109 – 6123.

2017   Mauricio Perez, Sandra Avila, **Daniel Moreira**, Daniel Moraes, Vanessa Testoni, Eduardo Valle, Siome Goldenstein, Anderson Rocha.
Video pornography detection through deep learning techniques and motion information.
[J.6] Elsevier Neurocomputing 230, 1, pp. 279 – 293.

2016   **Daniel Moreira**, Sandra Avila, Mauricio Perez, Daniel Moraes, Vanessa Testoni, Eduardo Valle, Siome Goldenstein, Anderson Rocha.
Pornography Classification: The Hidden Clues in Video Space-Time.
[J.7] Elsevier Forensic Science International (FSI) 268, 1, pp. 46 – 61.

Refereed Conference Papers

2021   William Theisen, Joel Brogan, Pamela Bilo Thomas, **Daniel Moreira**, Pascal Phoa, Tim Weninger, Walter Scheirer.
Automatic Discovery of Meme Genres with Diverse Appearances.
[C.1] In: AAAI International Conference on Web and Social Media (ICWSM), held virtually.

2019   **Daniel Moreira**, Mateusz Trokielewicz, Adam Czajka, Kevin Bowyer, Patrick Flynn.
Performance of Humans in Iris Recognition: The Impact of Iris Condition and Annotation-Driven Verification.
[C.2] In: IEEE Winter Conference on Applications of Computer Vision (WACV), Hawaii County, USA.

   Adam Czajka, **Daniel Moreira**, Kevin Bowyer, Patrick Flynn.
Domain-Specific Human-Inspired Binarized Statistical Image Features for Iris Recognition.
[C.3] In: IEEE Winter Conference on Applications of Computer Vision (WACV), Hawaii County, USA.

   Aparna Bharati, **Daniel Moreira**, Joel Brogan, Patricia Hale, Kevin Bowyer, Patrick Flynn, Anderson Rocha, Walter Scheirer.
Beyond Pixels: Image Provenance Analysis Leveraging Metadata.
[C.4] In: IEEE Winter Conference on Applications of Computer Vision (WACV), Hawaii County, USA.

2017   **Daniel Moreira**, Sandra Avila, Mauricio Perez, Daniel Moraes, Vanessa Testoni, Eduardo Valle, Siome Goldenstein, Anderson Rocha.
Temporal Robust Features for Violence Detection.
[C.5] In: IEEE Winter Conference on Applications of Computer Vision (WACV), Santa Rosa, USA.

   Daniel Moreira, Siome Goldenstein, Anderson Rocha.
Sensitive-Video Analysis.
[C.6] In: SBC Contest of Theses and Dissertations (CTD), São Paulo, Brazil.

   Aparna Bharati, **Daniel Moreira**, Allan Pinto, Joel Brogan, Kevin Bowyer, Patrick Flynn, Walter Scheirer, Anderson Rocha.
U-Phylogeny: Undirected provenance graph construction in the wild.
[C.7] In: IEEE International Conference on Image Processing (ICIP), Beijing, China.

   Allan Pinto, **Daniel Moreira**, Aparna Bharati, Joel Brogan, Kevin Bowyer, Patrick Flynn, Walter Scheirer, Anderson Rocha.
Provenance filtering for multimedia phylogeny.
[C.8] In: IEEE International Conference on Image Processing (ICIP), Beijing, China.

   Joel Brogan, Paolo Bestagini, Aparna Bharati, Allan Pinto, **Daniel Moreira**, Kevin Bowyer, Patrick Flynn, Anderson Rocha, Walter Scheirer.
Spotting the difference: Context retrieval and analysis for improved forgery detection and localization.
[C.9] In: IEEE International Conference on Image Processing (ICIP), Beijing, China.

Refereed Conference Papers (cont.)

2009 **Daniel Moreira**, Geber Ramalho, Patricia Tedesco.
Establishment of Multi-Agent Patrolling as a Benchmark for Multi-Agent Systems.
[C.10] In: AAAI International Conference on Agents and Artificial Intelligence (ICAART), Porto, Portugal.

Refereed Book Chapters

2022 **Daniel Moreira**, William Theisen, Walter Scheirer, Aparna Bharati, Joel Brogan, Anderson Rocha.
Image Provenance Analysis.
[B.1] In: Sencar, Verdoliva, and Memon (editors), *Multimedia Forensics*, pp. 389 – 432. Springer.

Refereed Workshop Papers

2018 Nathaniel Blanchard, **Daniel Moreira**, Aparna Bharati, Walter Scheirer.
Getting the subtext without the text: Scalable multimodal sentiment classification from visual and acoustic modalities.
[W.1] In: ACL Grand Challenge and Workshop on Human Multimodal Language, Melbourne, Australia.

2015 **Daniel Moreira**, Sandra Avila, Mauricio Perez, Daniel Moraes, Vanessa Testoni, Eduardo Valle, Siome Goldenstein, Anderson Rocha.
RECOD at MediaEval 2015: Affective Impact of Movies Task.
[W.2] In: MediaEval Workshop, Wurzen, Germany.

2014 Sandra Avila, **Daniel Moreira**, Mauricio Perez, Daniel Moraes, Isabela Cota, Vanessa Testoni, Eduardo Valle, Siome Goldenstein, Anderson Rocha.
RECOD at MediaEval 2014: Violent Scenes Detection Task.
[W.3] In: MediaEval Workshop, Barcelona, Spain.

Patents

2019 Sandra Avila, **Daniel Moreira**, Mauricio Perez, Daniel Moraes, Vanessa Testoni, Eduardo Valle, Siome Goldenstein, Anderson Rocha.
Multimodal and Real-Time Method for Filtering Sensitive Media.
[P.1] US010194203B2, USA. Filed June 30th, 2016.

2017 Sandra Avila, **Daniel Moreira**, Mauricio Perez, Daniel Moraes, Vanessa Testoni, Eduardo Valle, Siome Goldenstein, Anderson Rocha.
Método Multimodal e em Tempo Real para Filtragem de Conteúdo Sensível.
[P.2] BR1020160072654A2, Brazil. Filed April 1st, 2016.

Research Experience

SemaFor
(2020 – present)

Semantic Forensics Project
University of Notre Dame, Department of Computer Science and Engineering, Notre Dame, IN, USA
Sponsor: Defense Advanced Research Projects Agency (DARPA).
Collaborators: Purdue University, University Federico II of Naples, Politecnico di Milano, University of Siena, University of Campinas (Unicamp).
Co-Principal Investigator.

SILA
(2019 – present)

System for Scientific Image Analysis Project
University of Notre Dame, Department of Computer Science and Engineering, Notre Dame, IN, USA
Sponsor: Defense Advanced Research Projects Agency (DARPA).
Collaborators: Purdue University, University of Southern California (USC), University Federico II of Naples, Politecnico di Milano, University of Campinas (Unicamp).
Co-Principal Investigator.

MediFor
(2016 – 2020)

Media Forensics Project
University of Notre Dame, Department of Computer Science and Engineering, Notre Dame, IN, USA
Sponsors: Defense Advanced Research Projects Agency (DARPA) and Air Force Research Laboratory (AFRL).
Collaborators: Purdue University, University of Southern California (USC), New York University (NYU), University of Siena, Politecnico di Milano, University of Campinas (Unicamp).
Postdoctoral researcher. Advisor: Dr. Walter Scheirer.

SREFV (2018 – 2019)	Synthesis of Realistic Example Face Videos Project University of Notre Dame, Department of Computer Science and Engineering, Notre Dame, IN, USA Collaborators: FBI Biometric Center of Excellence, West Virginia University (WVU). *Postdoctoral researcher.* Advisor: Dr. Patrick Flynn.
TSHEPII (2017 – 2018)	Tool Supporting the Human Examination of Post-Mortem Iris Images Project University of Notre Dame, Department of Computer Science and Engineering, Notre Dame, IN, USA Collaborators: FBI Biometric Center of Excellence, West Virginia University (WVU). *Postdoctoral researcher.* Advisor: Dr. Adam Czajka.
SMA (2014 – 2016)	Sensitive Media Analysis Project University of Campinas (Unicamp), Institute of Computing (IC), Campinas, SP, Brazil Sponsor: Samsung Electronics. *PhD student.* Advisor: Dr. Anderson Rocha.

Teaching Experience

Biometrics (Spring 2022, 2020)	University of Notre Dame, Department of Computer Science and Engineering, Notre Dame, IN, USA CSE 40537 / 60537 undergraduate and graduate joint course. *Instructor.* Material available at https://danielmoreira.github.io/teaching/biometrics-spr22/
Data Structures (Spring 2015)	University of Campinas (Unicamp), Institute of Computing (IC), Campinas, SP, Brazil MC202 undergraduate course. Instructor: Dr. Anderson Rocha. *Teaching Assistant.*
Database Programming (Fall, Spring 2012)	Centro Universitário do Estado do Pará (CESUPA), Belém, PA, Brazil Systems and Database Programming 40h-module, within the Corporate Databases Graduate Program. *Instructor.*

Teaching Areas

Biometrics
Computer Vision and Image Processing
Machine Learning, Pattern Recognition, and Artificial Intelligence
Digital Forensics
Database Concepts and Systems
Data Structures, Programming Paradigms, and Programming Languages: C, C++, Java, Python
Elements, Fundamentals, and Introduction to Computing

Services

Member (2022 – 2023)	IEEE Signal Processing Society Education Center Editorial Board.
Member (2021 – 2023)	IEEE Information Forensics and Security Technical Committee (IFS-TC).
Proposal Reader	William Theisen. Doctoral, University of Notre Dame, proposed June 2022. Samuel Grieggs. Doctoral, University of Notre Dame, proposed May 2021. Thamiris Coelho. Master's, University of Campinas (Unicamp), proposed December 2021. Pedro Valois. Master's, University of Campinas (Unicamp), proposed August 2021.
Reviewer (Journals)	IEEE Transactions on Information Forensics and Security (T-IFS) Journal. Elsevier Pattern Recognition (PR) Journal. Elsevier Computer Vision and Image Understanding (CVIU) Journal. Elsevier Journal of Visual Communication and Image Representation (JVCI). Springer Signal, Image, and Video Processing (SIVP) Journal.
Reviewer (Conferences)	Springer European Conference on Computer Vision (ECCV), 2022. CVPR Workshop on Media Forensics (WMF), 2022, 2021, 2020. IAPR International Conference on Pattern Recognition (ICPR), 2022. IEEE International Conference on Image Processing (ICIP), 2021. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2022, 2021. IEEE International Conference on Autonomous Systems (ICAS), 2021. IEEE International Joint Conference on Biometrics (IJCB), 2022.

IEEE International Workshop on Information Forensics and Security (WIFS), 2022, 2021.
IEEE Winter Conference on Applications of Computer Vision (WACV), 2023, 2020.
IEEE WACV Workshop on Deepfakes and Presentation Attacks in Biometrics (DeepPAB), 2020.
ACM International Conference on Multimedia Retrieval, 2017.
SBC International Conference on Graphics, Patterns, and Images (SIBGRAPI), 2022.

Honors and Awards

2017 *Best 2016 Brazilian PhD Thesis in Computer Science*. Brazilian Computer Society (SBC).

2006 *Honor Graduating Student in Computer Science*. Brazilian Computer Society (SBC).

Technical Skills

Top Programming Languages: C, C++, Java, Python, and Matlab. Versed in: Unix shell script, Mathematica, SQL, Prolog, and Pascal. Sun Certified Programmer for the Java 2 Platform, Standard Edition 5.0, 2009.