Daniel H. Moreira

Assistant Professor at Loyola University Chicago

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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 Professor
(2022 – present)
Loyola University Chicago, Department of Computer Science, Chicago, IL, USA
Tenure-track Researcher and Instructor.

Assistant Research Professor
(2020 – 2022)
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

2023   João Cardenuto, Jing Yang, Rafael Padilha, Renjie Wan, **Daniel Moreira**, Haoliang Li, Shiqi Wang, Fernanda Andaló, Sébastien Marcel, Anderson Rocha.
The Age of Synthetic Realities: Challenges and Opportunities.
[J.1] APSIPA Transactions on Signal and Information Processing 12, 1, pp. 1 – 62.

2022   **Daniel Moreira**, João Cardenuto, Ruiting Shao, Sriram Baireddy, Davide Cozzolino, Diego Gragnaniello, Wael Abd-Almageed, Paolo Bestagini, Stefano Tubaro, Anderson Rocha, Walter Scheirer, Luisa Verdoliva, Edward Delp.
SILA: a system for scientific image analysis.
[J.2] Nature Scientific Reports 12, 18306, pp. 1 – 15.

Refereed Journal Articles (cont.)

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.3] 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.4] 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.5] IEEE Transactions on Information Forensics and Security (T-IFS) 16, 1, pp. 2493 – 2507.

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.6] 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.7] 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.8] 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.9] Elsevier Forensic Science International (FSI) 268, 1, pp. 46 – 61.

Refereed Conference Papers

2023   William Theisen, Daniel Gonzalez Cedre, Zachariah Carmichael, **Daniel Moreira**, Tim Weninger, Walter Scheirer.
Motif Mining: Finding and Summarizing Remixed Image Content.
[C.1] In: IEEE Winter Conference on Applications of Computer Vision (WACV), Hawaii County, USA.

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.2] 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.3] 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.4] 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.5] 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.6] In: IEEE Winter Conference on Applications of Computer Vision (WACV), Santa Rosa, USA.

     Daniel Moreira, Siome Goldenstein, Anderson Rocha.
Sensitive-Video Analysis.
[C.7] In: SBC Contest of Theses and Dissertations (CTD), São Paulo, Brazil.

Refereed Conference Papers (cont.)

2017   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.8] 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.9] 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.10] In: IEEE International Conference on Image Processing (ICIP), Beijing, China.

2009   **Daniel Moreira**, Geber Ramalho, Patricia Tedesco.
Establishment of Multi-Agent Patrolling as a Benchmark for Multi-Agent Systems.
[C.11] In: AAAI International Conference on Agents and Artificial Intelligence (ICAART), Porto, Portugal.

Refereed Workshop Papers

2023   Aidan Boyd, **Daniel Moreira**, Andrey Kuehlkamp, Kevin Bowyer, Adam Czajka.
Human Saliency-driven Patch-based Matching for Interpretable Post-mortem Iris Recognition.
[W.1] In: IEEE Winter Conference on Applications of Computer Vision (WACV) Workshop, Hawaii County, USA.

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.2] 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.3] 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.4] In: MediaEval Workshop, Barcelona, Spain.

Invited 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.

Editorial

2024   **Daniel Moreira**, Sébastien Marcel, Anderson Rocha.
Synthetic Realities and Artificial Intelligence-generated Contents.
[E.1] IEEE Security & Privacy 22, Special Issue 3, pp. 7 – 10.

2023   **Daniel Moreira**, Aparna Bharati, Cecilia Pasquini, Yassine Yousfi.
IH&MMSec '23: Proceedings of the 2023 ACM Workshop on Information Hiding and Multimedia Security.
[E.2] In: ACM Workshop on Information Hiding and Multimedia Security (IH&MMSec), Chicago, USA.

Patents
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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
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Scientific Integrity
(2019 – present)

System for Scientific Image Analysis Project
Loyola University Chicago, Department of Computer Science, Chicago, IL, USA
University of Notre Dame, Department of Computer Science and Engineering, Notre Dame, IN, USA
Sponsor: Department of Health and Human Services (HHS) and Air Force Research Laboratory (AFRL).
Collaborators: Purdue University, University of Southern California (USC), University Federico II of Naples, Politecnico di Milano, University of Campinas (Unicamp).
Co-Principal Investigator.

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 of Notre Dame, University Federico II of Naples, Politecnico di Milano, University of Siena, 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 Lab (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
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Machine Learning
(Spring 2024)

Loyola University Chicago, Department of Computer Science, Chicago, IL, USA
COMP 379 / 479 undergraduate and graduate joint course.
Instructor. Material available at https://danielmoreira.github.io/teaching/ml-spr24/.

Biometrics
(Fall 2023)

Loyola University Chicago, Department of Computer Science, Chicago, IL, USA
COMP 388 / 488 undergraduate and graduate joint course.
Instructor. Material available at https://danielmoreira.github.io/teaching/biometrics-aut23/.

Learning the Shell
(Fall 2022 to Spring 2024)

Loyola University Chicago, Department of Computer Science, Chicago, IL, USA
COMP 141 / 400D undergraduate and graduate joint course.
Instructor.

Teaching Experience (cont.)

Computing for the Sciences (Spring 2023)	Loyola University Chicago, Department of Computer Science, Chicago, IL, USA COMP 180 undergraduate course. *Instructor*.
Computer Vision Applications (Fall 2022)	Loyola University Chicago, Department of Computer Science, Chicago, IL, USA COMP 388 / 488 undergraduate and graduate joint course. *Instructor*. Material available at https://danielmoreira.github.io/teaching/cvapp-aut22/.
Biometrics (Spring 2022, Spring 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 (Spring and Fall 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
Media Forensics
Database Concepts and Systems
Data Structures, Programming Paradigms, and Programming Languages: C, C++, Java, Python, Shell Scripting
Elements, Fundamentals, and Introduction to Computing

Service

General Chair	11th ACM Workshop on Information Hiding and Multimedia Security (IH&MMSec), 2023. Loyola University Chicago, Chicago, US.
Associate Editor	IEEE Transactions on Information Forensics and Security (T-IFS) Journal, 2023 – present. Elsevier Pattern Recognition, 2023 – present.
Guest Editor	IEEE Security & Privacy Special Issue on Synthetic Realities and AI-generated Contents, 2024.
Reviewer (Journals)	IEEE Transactions on Information Forensics and Security (T-IFS) Journal. IEEE Transactions on Technology and Society (TTS) Journal. IEEE Transactions on Computers (TC) 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. Springer ECMLPKDD Workshop of Deep Learning and Multimedia Forensics, 2023. CVPR Workshop on Media Forensics (WMF), 2020 – 2022. 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), 2021 – 2024. IEEE International Conference on Autonomous Systems (ICAS), 2021. IEEE International Joint Conference on Biometrics (IJCB), 2023, 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), 2023, 2022.

Service (cont.)

Technical Committee	IEEE Signal Processing Society, Education Center Editorial Board, 2022 – 2023.
	IEEE Information Forensics and Security, Technical Committee (IFS-TC), 2021 – 2023.
Thesis Committee	Pedro Valois. Master's, University of Campinas (Unicamp), defended August 2022.
Proposal Reader	Edoardo Cannas. Doctoral, Politecnico di Milano, proposed November 2023.
	João Bachiega Jr. Doctoral, University of Brasilia, proposed November 2022.
	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.

Speaker   *Scientific Integrity Verification Through Image Forensics*, IEEE SPS-IFS TC Webinar, 2023.
Available at https://bit.ly/3Od1t42.

Fighting Scientific Misconduct with Media Forensics, 12th Annual Symposium on Digital Ethics, Loyola University Chicago, 2023.

Image Provenance Analysis for Disinformation Detection, Red Hat Research, 2022.
Co-authored with Walter Scheirer. Available at https://red.ht/3O97FKs.

Human-machine Pairing to Improve Computer Vision, IEEE International Joint Conference on Biometrics (IJCB) and IEEE Winter Conference on Applications of Computer Vision (WACV), 2022.
Co-authored with Adam Czajka, Kevin Bowyer, and Aidan Boyd. Available at https://bit.ly/43IcX5e.

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 scripting, Mathematica, SQL, Prolog, and Pascal. Sun Certified Programmer for the Java 2 Platform, Standard Edition 5.0, 2009.