



Miranda House

UNIVERSITY OF DELHI

Name: Nirmala Saini

Department: Physics

Current Designation: Assistant Professor

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Academic Qualifications (reverse chronological order):

- ⊕ **Ph.D.** – 2006-2013, Department of Physics, IIT Delhi, India, with C.G.P.A. 9.0/10, thesis entitled “**Investigations on biometric based information security systems**”.
- ⊕ Qualified **GATE** (Graduate Aptitude Test in Engineering **AIR-168**) in Physics 2006.
- ⊕ **Master of Science (M.Sc.) (Physics)** 2003-2005, University of Rajasthan, Jaipur, India. **(67.16%)**
- ⊕ **Bachelor of Science** (Physics, Chemistry, Mathematics, Hindi, English) 2000-2003, University of Rajasthan, Jaipur, India. **(69.55%)**
- ⊕ **Intermediate** (Physics, Chemistry, mathematics, Hindi, English) 2000, Board of Secondary Education, Rajasthan, Ajmer, India. **(70.46%)**
- ⊕ **High School (All Subjects)** 1998, Board of Secondary Education, Rajasthan, Ajmer, India. **(76%)**

Research Degree(s) (reverse chronological order):

- ⊕ Oct 2013- Dec 2013: Project Scientist, Department of Physics, Indian Institute of Technology Delhi.
Duties: Responsible for carrying out innovative research in the area of optical security systems.
- ⊕ **Ph.D.** – 2006-2013, Department of Physics, IIT Delhi, India, thesis entitled “**Investigations on biometric based information security systems**”.

Field of Specialization under the Subject/Discipline:

- ⊕ Biometric security systems
- ⊕ Biometric recognition system
- ⊕ Cryptography and Optical image Encryption
- ⊕ Optimization Techniques



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Total Teaching Experience:

Eight and half years of experience in various colleges of University of Delhi.

Teaching at Miranda House since:

Joined Miranda House on 02-01-2017.

List of Publications (reverse chronological order):

(Articles in referred/peer-reviewed/UGC Care journals/ Books/Book Chapters)

(A) Publications in International journals

1. **N. Saini** and A. Sinha, Efficient fusion of face and palmprint in Gabor filtered Wigner domain, *International Journal of Biometrics*, Vol. 12, No. 3 (2020) pp. 301-316.
2. **N. Saini** and A. Sinha, Video encryption using chaotic masks in joint transform correlator, *Journal of Optics*, Vol. 17 (2015) 035701 (8pp).
3. **N. Saini** and A. Sinha, Face and palmprint multimodal biometric systems using Gabor Wigner transform as feature extraction, *Pattern Analysis and Application* Vol. 18 (2015) pp. 921–932.
4. **N. Saini** and A. Sinha, Biometrics based key management of double random phase encoding scheme using error control codes, *Optics & Laser Engineering*, Vol. 51, (2013) pp. 1014-1022.
5. **N. Saini** and A. Sinha, Soft biometrics in conjunction with optics based biohashing, *Optics Communications*, Vol. 284, (2011) pp. 756-763.
6. **N. Saini** and A. Sinha, Optics based Biohashing using joint transform correlator, *Optics Communication*, Vol. 283, (2010) pp. 894-902.
7. **N. Saini** and A. Sinha, Optics based Biometric encryption using log polar transform, *Optics Communications*, Vol. 283, (2010) 34-43.
8. **N. Saini** and A. Sinha, Key management of the double random phase encoding method using public key encryption, *Optics & Laser in Engineering*, Vol. 48, (2010) pp. 329-334.



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(B) Publications in International conferences

1. **N. Saini**, Optical image encryption with a biometric security layer, Proc. Int. Conf. on Physics, Society and Technology (ICPST) 2019, pp- 34, 17-19 January 2019, Deshbandhu College, University of Delhi, Delhi-110007, India.
2. **N. Saini** and Alok Sinha, A palmprint recognition system based on Gabor Wigner transform as feature extraction technique, Proc. IEEE International Conference on Hand-based biometrics, 17-18 November 2011, Hongkong.
3. A. Sinha and **N. Saini**, Digital holographic security system based on multiple biometrics, *ACE Conf. on Applications of Computer Engineering*, pp-186 (2010), Penang, Malaysia.
4. **N. Saini** and A. Sinha, Comparative study of biohashing technique using different feature extraction methods, *PHOTONICS– 2010, Int. Conf. on Fiber Optics and Photonics IIT Guwahati*, pp. 458, December 11-15, 2010, Assam, India (Poster Presentation) (**Published as Proc. SPIE 8173, 81730T (2010); doi:10.1117/12.900129.**).
5. **N. Saini** and A. Sinha, Security enhancement of the double random phase encoding method using public key encryption, *PHOTONICS– 2010, Int. Conf. on Fiber Optics and Photonics IIT Guwahati*, pp. 82, December 11-15, 2010, Assam, India (Oral Presentation).
6. **N. Saini** and A. Sinha, Optimal filter design for pattern recognition using simulated annealing, *PHOTONICS – 2008, Int. Conf. on Fiber Optics and Photonics IIT Delhi*, pp. 425, December 13-17, 2008, New Delhi, India (Poster Presentation).

(C) Publications in National conferences

1. **N. Saini** and A. Sinha, Optical image encryption using Biometrics, *Proceedings of XXXIIIOSI Symposium on Optics and optoelectronics (2007)* pp. 155-157, December, 18-20, 2007, Tezpur Univ. Assam India (Oral Presentation).
2. **N. Saini** and A. Sinha, Multiple-image encryption using biometrics, *Proceedings of XXXIIIOSI Symposium on Optics and optoelectronics (2007)* pp. 439-442, December, 18-20, 2007, Tezpur Univ. Assam, India (Oral Presentation).

Educational Resource Material Developed (reverse chronological order): No



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Research Guidance (reverse chronological order): No

Research Projects (reverse chronological order):

- ⊕ Participated as teacher mentor in "**Summer Workshop**" June to July 2022, Miranda House, University of Delhi. (1. Identification of Brain tumor in MRI scan using Digital Image Processing. 2. The Biometric Authentication).
- ⊕ Participated as teacher mentor in "**Online Summer Workshop**" June to July 2021, Miranda House, University of Delhi. (1. Astronomical Image processing, 2. Danger detection through hand gesture, 3. Iris recognition- allowing entry to an Institution by eliminating the use of identity cards).
- ⊕ Participated as teacher mentor in "**Online Summer Workshop**" June to July 2020, Miranda House, University of Delhi. (Biometric security systems and access control).
- ⊕ Participated as teacher mentor in "**Summer Workshop**" June to July 2019, Miranda House, University of Delhi.
- ⊕ Participated as teacher mentor in "**Summer Workshop**" June to July 2018, Miranda House, University of Delhi.

Membership Of Professional Bodies (reverse chronological order):

Optical Society of America (OSA), student membership no. – 968296

Optical Society of India (OSI), Regular Fellow Member No.1594

Administrative Responsibilities (reverse chronological order):

- ⊕ Working as a faculty member of “Unnat Bharat Abhiyan programme” in Miranda House, University of Delhi (2020-22).
- ⊕ Working as a faculty member of “SPIC MACAY” in Miranda House, University of Delhi (2021-till now).
- ⊕ Working as a faculty member in “Admission committee” in Miranda House, University of Delhi (2022-till now).

Invited talks/Session chair/Resource person (reverse chronological order):

- ⊕ Invited as speaker on the topic “**Optics based biometric security systems**” in six day Faculty Development program on “Research Techniques in Science and Technology,



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Organized by K.R.Mangalam University, Gurugram in Collaboration with Gargi College, University of Delhi from 18th July to 23rd July, 2022.

Conferences Organised (reverse chronological order): No

Seminars/Workshops/Conferences attended (reverse chronological order):

- ⊕ Attended an online six days Faculty Development programme on “**Research Techniques in Science and Technology**”, Organized by K.R.Mangalam University, Gurugram in Collaboration with Gargi College, University of Delhi from 18th July to 23rd July, 2022.
- ⊕ Paper presented in **International Conference on Physics, Society and Technology (ICPST) 2019**, 17-19 January 2019, Deshbandhu College, University of Delhi, Delhi-110007, India.
- ⊕ **Attended “A three-day Science conclave: Research on the frontiers”** held at Miranda House, university of Delhi, 10 -12 January 2018.
- ⊕ Attended, Faculty Development Programme on “**Multifunctional Materials for Energy Harvesting and Allied Devices**”, Organised by Atma Ram Sanatan Dharma College, University of Delhi, India, 10th Nov 2017.
- ⊕ Workshop on “**Online Labs for School Experiments**” Organised by Miranda House (University of Delhi) in collaboration with Amrita University, Kerala on **11 April 2017**.
- ⊕ 1st Indo-UK conference on recent advances in chemical sensors, Organised by Gargi College University of Delhi, 10-11 Jan 2014.
- ⊕ Photonics- 2008, International Conference on *Fiber Optics and Photonics IIT Delhi*, December 13-17, 2008, New Delhi, India (Poster Presentation).
- ⊕ *PHOTONICS– 2010*, International Conference on *Fiber Optics and Photonics IIT Guwahati*, 82, December 11-15, 2010, Assam, India (Oral and Poster Presentation).
- ⊕ *XXXIIIOSI Symposium on Optics and optoelectronics (2007)*, December, 18-20, 2007, Tezpur Univ. Assam India (Oral and Poster Presentation).

Synergy (work with other organizations outside the college): No