

ANNUAL REPORT OF NITW SPIE STUDENT CHAPTER

(1009746 National Institute of Technology Warangal Chapter)

i) ABOUT NATIONAL INSTITUTE OF TECHNOLOGY (NIT), WARANGAL:

Pandit Jawaharlal Nehru (Former prime minister of India), the architect of the concept of Regional engineering colleges (RECs) for technical advancement and promotion of national integration in the country, laid the foundation stone for REC Warangal on 10th October 1959. REC Warangal holds the distinction of being the first in the series of RECs, established in the country. Now elevated to the status of a deemed University in 2002 and renamed as National Institute of Technology (NIT). It has the distinction of offering the highest number of post-graduate courses, produced the maximum number of PhDs amongst all the NITs in the country.

During the span of 50 years of existence, it has become a proud *Alma matter* for over 10,824 graduates in different branches of technology, 5689 postgraduates and 293 Doctorates in technology and science. The alumni of the institute can be found across the globe adorning very high positions in academics, industry, politics, administration, research and entrepreneurship, thus creating an international flavor of the institute. As part of its admission policies today, it draws students from different parts of the world for its UG, PG and PhD programmes under DASA and other schemes of the government of India. It is, thus, becoming an international institute of technical excellence, offering quality technical education.

The institute is presently offering eight undergraduate programmes in civil, Electrical and Electronics, Mechanical, Electronics and communication, Metallurgical, chemical, computer science and engineering and Biotechnology engineering streams; and twenty six Postgraduate programmes in diverse branches of engineering and basic sciences including M.Sc(Tech), M.Sc, MBA and MCA. The institute also offers Ph.D. programmes in Engineering, Science and Humanities disciplines. It has currently ongoing projects sponsored by MHRD for RS 1.2 crores and other agencies such as CSIR, DST and other agencies for an amount of Rs 34.56 lakhs. A central research facility is established with a view to promote research capabilities under TEQUIP project funded by World Bank. The placement on the campus during the year 2006-07 has been excellent. 127 organizations visited the campus and 522 students, almost 98% of the overall institute have been placed.

The institute is located in a sprawling area (248 acres) with a residential campus with accommodation of for all students and staff. The institute has 18 student clubs and 10 departmental associations, which organize activities to promote total personality development of the students.

The alumni association of the institute is quite active and has fifteen chapters in various cities of the country and one chapter in USA. The institute maintains a close rapport with the alumni in all matters relating to the institutes progress.

ii) ABOUT THE DEPARTMENT OF PHYSICS AT NIT, WARANGAL:

The department of physics at **National Institute of Technology (NIT), Warangal** has been running an Industry-oriented, 3-year postgraduate course, M.Sc(Tech.)-Engineering physics, offering specializations in **PHOTONICS, ELECTRONICS** and **INSTRUMENTATION**. The students of **photonics stream** are trained (both in theory and laboratory) in the latest fields like: *laser technology and their applications, Non-linear optics, Optoelectronic devices, Fiber and Integrated Optics, Optoelectronic sensing, Optical data processing and Holography, Optical system design, Optical production and testing, Optical metrology* in addition to *Basic Electronics, Microprocessors, Computer languages and Graphics courses*, etc. following by 16 weeks of practical training and 24 weeks dissertation work in leading R& D organizations and industries in India like: IRDE, CSIO, BARC, CAT, BEL, ISRO, NAL, ECIL, Systronics, Defence organizations, Asia General Optics, etc.

The photonics group of the department of physics at National Institute of Technology, Warangal has been involved in developing the indigenous techniques for recording Holographic gratings/HOEs in DCG and photopolymer materials, Optical Holography & Speckle photometry for NDT, Acoustical holography, Optical design and Instrumentation, Laser Applications, Optoelectronic Sensing, Development of Opto-mechanical items and different experimental kits in Applied Optics & Photonics. The photonics group has completed a good number of R&D projects in Optics and photonics and published and presented about 250 Research papers in International and National level journals and conferences. Some of the activities are given below:

A) Completed R & D and Consultancy schemes:

- 1. Advanced Optical Transducer for Industrial Measurements**
(AICTE, New Delhi, Rs. 6.0 lakhs, F.No.8017/RDII/BOR/95/RELEO/76/ REC307, 1996-99)
- 2. Holocoupler for Optical circuits – Development of DCG Technology.**
(DST, New Delhi, Rs. 14.45 lakhs, No.SP/S2/L-04/93, 1994-98)
- 3. Modernisation and Removal of Obsolescence of Physics Labs**
(MHRD, New Delhi, Rs.5.0 lakhs, No.F.3-1/91 TD IV dt. 27-2-92 and Rs. 5.0 lakhs, No.F.No.801-1/RD II/MOD/94/112 dt. 24-1-95)
- 4. A Centre of Excellence in the area of “ Development of Lasers and their Industrial and Technological Applications” in the Emerging Area of Laser Technology.**
(MHRD, New Delhi, Rs. 8.0 lakhs, No.F.2-5/88-T7 dt.19-12-88)
- 5. Acoustical Holography and Image processing**
(DST, New Delhi, Rs. 17.47 lakhs, No.24, IP-27/83-stp-II,1984-88)
- 6. Ultrasonic Holography for Medical Diagnostics and NDT.**
(DOE, Electronics Commission-IPAG, New Delhi, Rs.4.70 lakhs, No. 2(46)/ 179-TDID-22215, 1980-83)
- 7. Design and fabrication of Optical Data processing System and Analysis of Air born and Ground Magnetic data**
(CSIR, New Delhi, Rs. 0.84 lakhs, No. 8(18)/79/EMR – 110, 1979-82)

- 8. Holographic and Speckle Interferometric Studies on Pressure Vessels and other Structural Members.**
(DRDL, Hyderabad / AR&DB, New Delhi, Rs. 1.084 lakhs, No. AERO/RD/ 134/ 100/ 0/99-80/ 240,1980-81)
- 9. Design of Profile Projector**
(NIL, Calcutta, Rs. 0.90 lakhs, No.RECW/ICC/77/11634, 1977-79)
- 10. Stress Analysis of Diaphragms using Holographic interferometry**
(BHEL- R & D Unit, Hyderabad, Rs. 0.62 lakhs, No. A14102-6,1977)
- 11. Development of Automatic Lens Design Package for Photography Systems**
(UGC, New Delhi, Rs. 0.426 lakhs, No. F-23-3-751SR, dt.8-3-75)
- 12. Design and development of Holographic setup.**
(BEL, Machilipatnam, Rs. 0.10 lakhs, 1998)
- 13. Design and development of Nitrogen laser for Dye laser studies.**
(REC, Warangal, Research grants, Rs. 0.50 lakhs, 1985)
- 14. Emerging areas – Laser Technology (Maintenance grants in 4 phases)**
(MHRD, New Delhi, Rs. 1.0 lakh, No.F.16-1/91 TD VI dt. 18-3-92; Rs. 2.0 lakhs. No.F.16-1/92-TD VI dt. 13-3-1993; Rs.2.0lakhs,No.F.2-1/93 TD VI dt. 24-3-94; Rs. 0.65 lakhs, F.No. 838-2/RDII/MHRD(MG)/94 dt. 27-3-1995)
- 15. Development of fiber optic intensity sensor for Engg. Measurements.**
(REC, Warangal, Rs. 0.30 lakhs, 1997-98)
- 16. Specialized equipment and lab. Development – Centres of Excellence.**
(REC, Warangal, Rs. 6.00 lakhs, 1998)
- 17. Modernization of UG & PG laboratories of physics**
(MHRD, New Delhi, Rs. 12 lakhs, 2003)
- 18. Fiber Bragg Grating Sensor for Engineering Measurements.**
(MIT, New Delhi, Rs. 12.57 lakhs, No.12(1)/2003 – CMPD Dt. 8-1-2004)
- 19. Received equipment gift worth Rs. 26.35 lakhs in 2006 from Agilent Technologies, USA, under 'Equipment program for the University teaching laboratory'.**

B) Ongoing Schemes :

- 1. Center for Photonics**
(MHRD, New Delhi, Rs. 19.00 lakhs, F.28-34/2003-TS.V dt.16-12-2003)
- 2. Advanced Fiber Optic Sensor System for Multiparameter Sensing.**
(MHRD , New Delhi, Rs. 12 lakhs, F.27 – 1/2004 – TS.V dt. 31-3-2005)..
- 3. Development of Holographic Optical Element for Holographic Weapon Sight (HWS)**
(BEL, Machilipatnam, Rs. 6.63 lakhs, 380/56/HWS dt.20- 04- 2005)

C) Other Research & Developmental Activities:

- ❖ In the Department of Physics, Advanced Holographic, Speckle Interferometric and ESPI facilities for real time NDT were created. Using these facilities, the following projects were completed:
 - a) Three dimensional displacement analyses of materials for Aircraft body construction, NAL, Bangalore.
 - b) Evaluation of aluminium beams of different cross sections.
 - c) Stress analysis of Lathe bed modal, HMT, Hyderabad.
 - d) Stress analysis of Missile fuel tank (biggest object ever tested in India by Holographic NDT), DRDL, Hyderabad.
 - e) Functional evaluation of Diaphragms in turbines, BHEL(R&D), Hyderabad
- ❖ A pulsed Nitrogen laser pump source was designed and constructed to develop the dye laser systems for wavelength tuning and to study the laser action in indigenously synthesised dyes.
- ❖ Czerny-Turner type monochromator with sine bar mechanism for grating mount was designed and developed in the dept.
- ❖ Developed Optical fiber sensors for sensing strain, temperature, displacements, and fiber optic lathe tool dynamometer, etc. under UG/PG project works & R&D projects.

D) MOU :

- ❖ The Department of Physics has entered into MOU with BEL, Machilipatnam for collaboration in the field of optoelectronic instrumentation on 24 June 1991 for R & D, training and man – power development.

E) Fields of Interest:

- ❖ Photonics in Bio – Medical Applications.
- ❖ Non – Linear Optics & Applications
- ❖ Optoelectronic Devices & Sensing
- ❖ Optical & Laser Metrology
- ❖ Holography recording materials & Applications

iii) **SPIE Student chapter activities upto Dec. 2008:**

1. Names, email addresses, and Member numbers of elected Officers

Sl.No	Name	e-mail address	Elected Officer
1.	S.Bharat Kumar	bharatkumar3@gmail.com	President
2.	D.V.Kiran kumar	venkatkiran8@yahoo.co.in	Vice President
3.	Anumula Sandeep	anumula.sandeep@gmail.com	Secretary
4.	Dipankar Sengupta	guuptasengupta@gmail.com	Treasurer
5.	Prof. K. Srimannarayana	ksn.kamineneni@gmail.com	Faculty Advisor

2. List of current Student Chapter Members.

(Please see the separate attached list with corrections of names, email and address marked with *)

3. Details of Chapter activities since last report.

a) Special lectures delivered by experts:

Sl. No.	Name of the expert	Name of the topic	Date
1	Prof. K Thyagarajan, Department of Physics, Indian Institute of Technology Delhi, New Delhi 110016	Physics of optical fiber communications	24-01-06
2	Prof. A. Selvarajan, ECE Dept., Indian Institute of Science, Bangalore	MEMS and MOEMS	12-08-06
3	Prof. R. M. Vasu, Instrumentation dept., Indian Institute of Science, Bangalore	Optical Tomography	14-11-06
4	Dr. A. Ramakrishna, Scientist G, AERB, Mumbai	Nuclear Energy	17-01-07
5	Dr. N.J. Babu, Manager, Hindu Hivac, Baqngalore.	Thin films	30-04-07
6	Prof. K. Srimannarayana, Dept. of Physics, NIT, warangal	Visit of Universities at Boston, USA and Photonics activities at MIT, UMASS- Lowell, Northeastern Uni.	18-09-07

		and Boston University	
7	Dr. D.s. Kesava Rao, asst. prof., Dept. of Maths and humanities, NIT, warangal	Participating in group discussions	15-10-07
8	Prof. Thiruvenkataswamy, Head, Dept. of Maths and Humanities	Communication skills	18-01-08
9	Dr. P.V.Ramana, Member of Technical staff, Microsystems lab, Institute of Microelectronics, Singapore	Future is photonics	18-03-08
10	Prof. K. Srimannarayana, Dept. of physics, NIT, warangal	Holography and its applications	14-08-08
11	Prof. A. ramachandraiah, Dept. of Chemistry, NIT, warangal	Methods of science	17-10-08
12	Prof. T.K.V. Iyengar, Dept. of Maths and Humanities, NIT, warangal	Mathematical modeling	04-01-2009

b) EDUCATIONAL TOURS:

- 1) M.SC. (Tech) – III & V students visited BEL, Machilipatnam to see the Optics and Optoelectronics facilities during their winter vacation december 2007
- 2) Ten of our M.sc. (Tech) final year students have attended Science conclave conducted by DST & MHRD, New Delhi, Govt. of India during their summer vacation, June 2008 to motivate the students into Research.
- 3) M.sc. Tech.) –II semester students have visited various Optics and Electronics Industries located at Hyderabad during December 2008

c) PRESENTATION OF RESEARCH PAPERS BY OUR RESEARCH STUDENTS & FACULTY:

1. K. Srimannarayana, M. Sai Shankar, R. L. N. Sai Prasad, et. al “Simulation of Fiber Bragg Grating and Long Period Grating Characteristics and their use for Simultaneous measurement and Discrimination of Strain and Temperature effects”, Presented in the 32nd OSI Symposium on Contemporary Optics and Applications, 1-3 March 2007, held at The M S University, Vadodara.
2. P. Rajesh Kumar, N Raghavender, N. Rama Murthy, K. Srimannarayana, M. Sai Shankar, R. L. N. Sai Prasad “System Design Aspects of Holographic Weapon Sight” Presented in

the 32nd OSI Symposium on Contemporary Optics And Applications, 1-3 March 2007, held at The M S University, Vadodara.

3. P.Saidi Reddy, R.L.N Sai Prasad, K.S.Narayana, M.Sai Shankar, D.Sen Gupta and S.Ravi Prasad “ Sapphire Fiber Brag Grating Sensor for High Temperature Measurements” Presented in National conference on Recent Trends in Physics, held at Pingle Govt. Degree & P.G. college for women, Warangal during 11-12 September 2008.
 4. P.Saidi Reddy, R.L.N Sai Prasad, K.S.Narayana, M.Sai Shankar, D.Sen Gupta and S.Ravi Prasad “High Temperature Measurements using Fiber Brag Grating sensors” Proceedings of the Sixth Structural Engineering Convention, SEC-2008, December 18 – 20, 2008, Chennai, India, pp. 1023 – 1032
 5. D.Sengupta, P.Saidi Reddy, K.S.Narayana, M.Sai Shankar, R.L.N.Sai Prasad S.Ravi Prasada Rao. “Fiber Bragg grating sensor system for multi-axis strain and temperature sensing “ Presented at National conference Recent Trends in Physics, held at Pingle Govt. Degree & P.G. college for women, Warangal during 11-12 September 2008.
 6. K.Srimannarayana, M.Sai Shankar, R.L.N.Sai Prasad, D.Sengupta, N.Eknath Rao, S.R.P.Rao “Simulation of Multi-parameter fiber bragg grating sensor Presented at Photonics 2008- International conference on Fiber Optics and Photonics Organized by Indian Institute of Technology Delhi, India during 13-17 December 2008
- Describe exactly how chapter grant funding was spent – No funds were raised separately
 - Were these activities described in your funding request – So far no request was made

4. Details of planned activities for the future.

- 1) Regular lectures on photonics & optics and its applications. by the faculty
- 2) Educational tours to B.E.L, R.C.I, D.R.D.O, N.F.C etc.
- 3) Monthly workshops for students regarding the lab experiments on optics & Photonics.
- 4) Lectures by students at nearby schools and colleges on developments in photonics.
- 5) Photonics exhibition: proposed to be organized in the Golden Jubilee year of NITW in October 2009.
- 6) Workshop on Engineering Applications of photonics to the teachers of nearby engineering colleges.
- 7) Interaction with other S.P.I.E members and student chapters in India.

5. Financial information.

One bank account in the name of “NITW SPIE Student Chapter” was opened in State Bank of Hyderabad with A/C No: 62085287823.

- a. Beginning balance : Rs. Rs.500
- b. Funds raised and expended (indicate amounts and source/destination)

Rs. 800 (Through student members contribution as seed money))

c. Details of SPIE funding received - Nil
d. Other sources (please specify) - Nil

e. Ending balance - Rs.1302
(Including minimum balance of Rs. 500 to maintain account in the bank)

f. *Special note for Outreach Events:* Please estimate the number

For special reach programs like conducting workshop, Open house, special lectures, etc during this golden jubilee year of the Institute, we prepare the estimates for funding and will be submitted to SPIE for 30 members approximately.