REPORT OF ACHIEVEMENTS WHICH LEAD TO INSTITUTIONAL EXCELLENCE

MGM INSTITUTE OF HEALTH SCIENCES
(Deemed-to-be-University u/s 3 of UGC Act 1956)
Grade "A" Accredited by NAAC
Sector 1, Kamothe Navi Mumbai-410209,
Tel.No.:022-27437699,27437838; Website : www.mgmuhs.com

[2014-2019]

Content

Mahatma Gandhi Mission Trust

Mahatma Gandhi Mission, a Charitable Trust was established on 20th December, 1982, with a vision to provide excellence in professional education, affordable health services, to promote research and innovation. Mahatma Gandhi Mission which started with a moto of "Wipe the Tears from every eye" made humble beginning by providing health services in rural areas of Nanded district, Maharashtra. Since then, it has expanded heath services to Nanded, Aurangabad and Navi Mumbai from Primary Health Care to excellent Superspeciality Hospitals at affordable cost to the community, especially below poverty line of urban as well as rural area.

Trust has started educational activities from Pre Primary education to Post Graduation in Engineering, Management, Architecture, Computer Sciences, Information Technology, Biotechnology, Bioinformatics and Health Sciences at Nanded, Aurangabad, Navi Mumbai and Noida, UP.

To give all round development to children, trust has developed environmental friendly campuses, sports grounds and facilities, Mahagami Traditional dance art "Katthak", "Pakhavaz" music institute of Guru Shiya Parampara at Aurangabad. Trust has also started "MGM Khadi" production of cotton thread to cloth and derive of plantation to protect environment and to ensure dignity of Labour amongst students.

Mahatma Gandhi Mission is managed by highly qualified Professionals, Engineers and Doctors. Trust Chairman is Shri Kamal kishor Kadam, M.Tech, IIT Mumbai. Remaining Trustees are Mr. A.N.Kadam, BE, Dr. P.M.Jadhav, FRCS (UK), Dr. S.N.Kadam, FRCPE, Prataprao Borade, M.Tech, Dr. Nitin Kadam, MD, UjwalKadam, BE.

As on today Trust runs 75 institutes providing educations to 20,000 students with a pool of 1000 faculty members.

Deemed to be University Status at Navi Mumbai and Aurangabad

The two MGM Medical Colleges, at Navi Mumbai and Aurangabad, under the umbrella of MGM Trust were established during 1989 and 1990, respectively. It was during 2006 that the Department of Higher Education, Ministry of Human Resource Development, Government of India had conferred the status of Deemed to be University (under section 3 of UGC Act 1956) to MGM Institute of Health Sciences MGMIHS with the two constituent medical colleges (UGC Letter No. F-9-21/2005-U.3 (A, dated 30th August 2006). Thousands of medical doctors and paramedical staff from these prestigious institutions are providing finest healthcare services to millions of people, both in India and abroad.

In the subsequent years, during 2007-09, the University with the permission of the Academic Council and Board of Management of MGMIHS started Department of Physiotherapy, Department of Nursing, and Department of Biomedical Sciences. It may be mentioned that these University Departments and the courses offered under each of these Departments were covered and intimately connected with the broad scope and mandate of the University at the UGC approved campuses, Navi Mumbai and Aurangabad

It may be mentioned that UGC Expert Committee in 2009 had inspected MGMIHS and its constituent units/institutions at both Navi Mumbai and Aurangabad campuses namely; medical, nursing, physiotherapy and biomedical sciences, and had made the following recommendations:

"The Committee found that MGM University of Health Sciences, Navi Mumbai has infrastructural facilities. The academic standards of the university are appreciably high. University has excellent administrative and supportive staff, which contributes to the progress of the University. The University has a beautiful campus with all modern and basic amenities required for an institution of higher learning in the era. ***Accordingly, the Committee strongly recommends that the status of Deemed to be University for MGM University of Health Sciences, Navi Mumbai be continued and strengthen further with all possible support and help."***

MGM Institute of Health Sciences

MGMIHS, today is an innovation-driven premier health science institute in India. The institute strives to serve all through exemplary health care, education, research and community services. Commitment to excellence is evidenced by Accreditation of University by National Assessment and Accreditation Council (NAAC) with Grade 'A'; accreditation of teaching hospitals and blood bank by National Accreditation Board for Hospital (NABH); and accreditation of diagnostic laboratories by Accreditation Board for Testing and Calibration Laboratories (NABL).

These accreditations are a reflection of the highest standards of academic programs, technical competence of medical laboratories following ISO/IEC 17025:2005, ISO 15189:2007 Standards, and hospital standards in consonance with global benchmarks set by International Society for Quality in Healthcare. These standards are also testimony of highest standards of patient safety and quality of care provided by teaching hospitals of MGMIHS, which is evident from the certification of Scientific and Industrial Research Organisation (SIRO) and govt scheme Mahatma Jyotirba Phule Jan Arogya Yona (MJPJAY) in both the campuses.

Today, MGMIHS is a multi-specialty health sciences institute where it's Medical Colleges, and Department of Biomedical Sciences, Physiotherapy, and Nursing offer a variety of undergraduate, postgraduate, super specialty and PhD degree programmes. About 126 programmes in health sciences are offered by this deemed to be university, and these courses are finding acceptance by large number of students not only in India but also foreign students. The institute has over 4000 students enrolled in different colleges and departments in the two

campuses. During the academic year 2018, the University had enrolled about 925 students in various programmes.

The faculty employed at MGMIHS not only meets the guidelines of Medical Council of India and other regulatory bodies, but are in excess so as to provide teaching in smaller groups and to help the slow learners. About 1022 faculty members are employed in Medical Colleges and other department at both the campuses. They are dedicated to teaching, research, clinical care and community services. Faculty exchange between the two campuses is particularly encouraged to learn from each other's experiences. The colleges are also encouraged to invite experts from other institutions in the country to deliver lectures on specific topics as well as to enhance the technical skills of faculty at MGMIHS.

MGM Medical College and Hospital, Navi Mumbai was adjudged the best medical institute in the western region of India by the Jury for LOKMAT National Education Leadership Award, during 2015. MGM Medical College, Aurangabad is ISO Certified and rated among the top 30 medical college in India in HT Survey 2016. It has also received CCLA award.

The institute has during the last thirteen years provided an excellent standard of education and training to thousands of students. The accomplishments of the institute are a reflection of the vision, commitment, hard work and dedication of the faculty, staff and students of the constituent Medical Colleges and University Departments. Collectively we will continue to endeavor to ensure that the Vision and Mission of the University is accomplished and it is among the top ranking institutions not only in India but globally.

V I S I O N

MGM Institute of Health Sciences aims to be a top ranking Centre of Excellence in Health Science Education, Health Care and Health Research.

M I S S I O N

Students graduating from the Institute will have the required skills to deliver the quality health care to all the sections of the society with compassion and benevolence, without prejudice or discrimination at an affordable cost.

As a Research Centre, it shall focus on finding better, safer and affordable ways of diagnosing, treating and preventing diseases. In doing so, it will maintain highest ethical standard.

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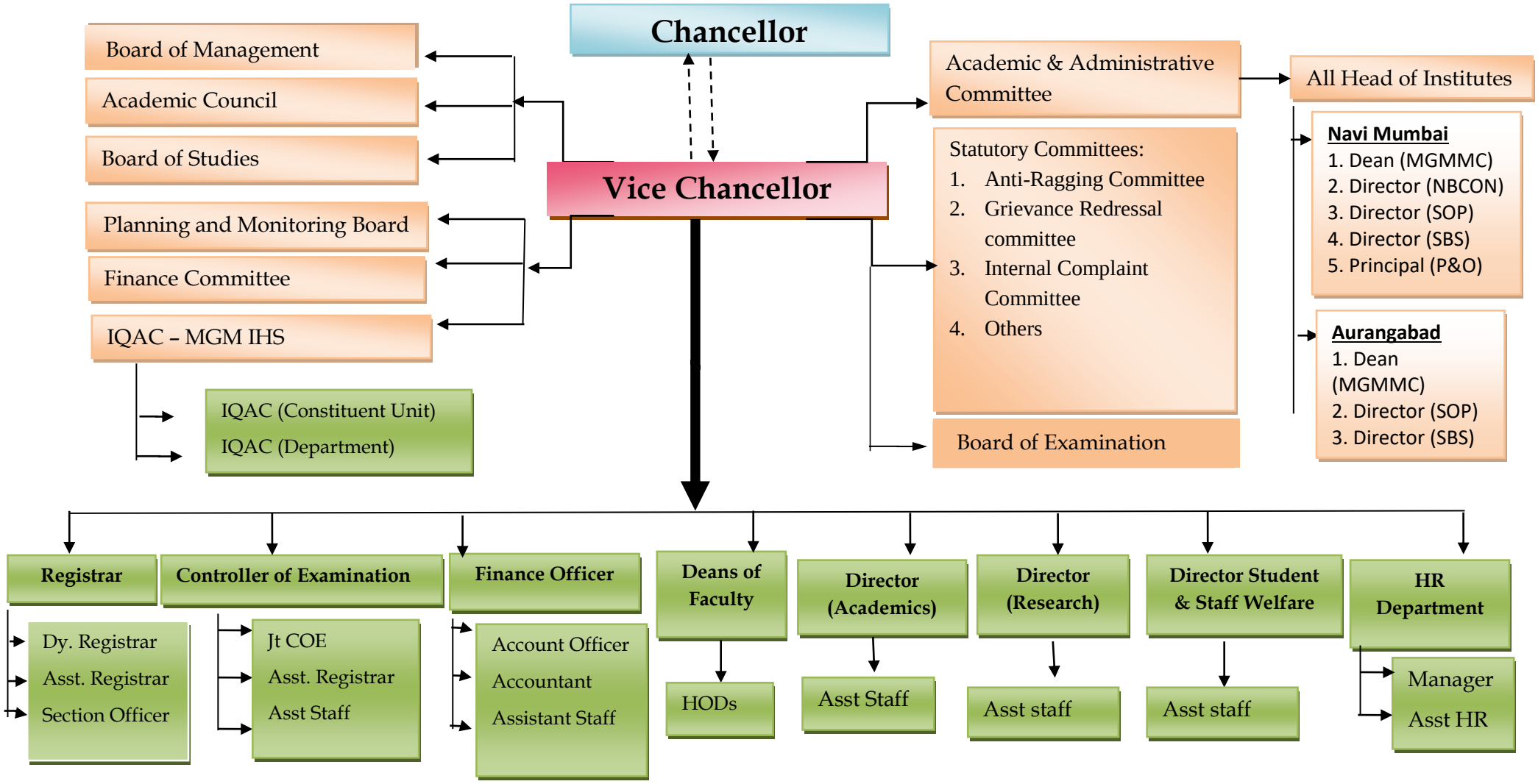
'To wipe every tear from every eye.'

Mahatma Gandhi



Dr. Rajesh B. Goel
Registrar
MGM INSTITUTE OF HELATH SCIENCES
(DEEMED UNIVERSITY u/s 3 of UGC Act,1956)
NAVI MUMBAI- 410 209

Achievements of MGMIHS

Academic progression at a Glance

S N.	Parameters	Academic Excellence over 12 years			
A	Courses	2006-07		2018-19	
		Intake	Enrolled	Intake	Enrolled
	MBBS	200	200	300	300
	MD/MS/Diploma	50	40	164	112
	DM/MCh.	NA	NA	8	5
	B.P.T	NA	NA	130	130
	M.P.T	NA	NA	33	12
	B.Sc. Nursing	NA	NA	50	50
	Post B.Sc. Nursing	NA	NA	30	09
	M.Sc. Nursing	NA	NA	30	7
	B.Sc. Allied Health Sciences	NA	NA	260	173
	M.Sc. Medical and Allied	NA	NA	139	53
	Bachelor in Prosthetics & Orthotics	NA	NA	45	23
	Ph.D	NA	NA	102	06
	Ph.D in Physiotherapy	NA	NA	06	00
	Ph.D in Allied Health Sciences	NA	NA	56	06
B	**Degrees Awarded**	Nil		4762	
C	**State of The Art Infrastructure**	**Specialized Labs:** 1. Biochemistry Research Lab 2. Hematology Research Lab 3. Dept of infectious disease in collaboration of University of Taxas at Houston, USA		• MGMIHS Incubation and Innovation Centre • MGMIHS Skill lab (American Heart Association) • MGMIHS OMICS Research Centre • MGM Sleep Lab in collaboration with University of Pennsylvania, USA • MGM Centre of Human Movement Science is established with support from International Society of Biomechanics, Bio Engineering and Technology Incubation Centre, IIT Bombay and Cardiff University, UK. • MGM Central Research Lab, State of the Art Central Research Lab at Navi Mumbai and Aurangabad • State of the Art Biotechnology Laboratory and Pulmonary Lab. • Zebra fish facility in Central Research Lab.	

ACCOMPLISHMENTS (2014-2019)

Major Achievements

- MGMIHS accredited as Grade 'A' by NAAC.
- NABL Accredited laboratories
- SIRO Accredited Research Laboratories
- NABH Accredited Blood Banks and Hospital.
- NIRF 2019 (University Rank Band 151-200)
- UNESCO Chair of Bioethics Unit (2016).
- MGM Medical College (NM) received 3rd rank Swachh Campus ranking 2018 by MHRD.
- MGM Medical College (NM) received 1st rank in Swachh Campus Ranking 2019 by MHRD.
- MGMIHS students won 1st position as well as various rankings in national level online survey on Gandhian values by ReThink India Organisation on 150th birth anniversary of Mahatma Gandhi.
- MGM Medical College, Aurangabad is among the top 30 medical college (HT Survey 2016).
- MGMIHS has received Corporate Counsel for Leadership and Awareness award for its excellence in Education.

2014-15

- Initiation of 4 new Programs (MD Emergency Medicine, MD Geriatrics, MD Immunohaematology and Blood Transfusion, Nurse Practitioner Course)
- Initiation of 17 Fellowships
- Faculty Development Programs like Conferences, CME, Workshops,
- Implementation of Communication Skills module
- Indian Patent Fill with Birla Institute of Technology And Science (BITS), Goa, BARC 2014
- Training of Medical UG, PG, Students, Interns, Nurses And other Paramedical Staff In Community Health with MGM Medical College And Yusuf Meherally Centre, TARA
- Research, PhD Work and Publications with National Institute for Research in Reproductive Health (NIRRH), Mumbai
- Two Machine I.e. Intense Light and Narrow Band UVB should be kept in skin OPD of MGM hospital with Marathwada Association of Dermatologist, Venereologist & Leprologists.
- Eye Donation Centre of MGM Is Affiliated To Eye Bank of Kamalnayan Bajaj Hospital
- Eye Donation Centre of MGM Is Affiliated to Eye Bank of Drushti Eye Institute
- Employee Health Check-Up Colgate Palmolive
- Placement of student for field work at MGM Hospital Tata Institute of Social Sciences

2015-16

- Faculty Development Programs like Conferences, CME, Workshops, ICCME 2015
- Implementation of Communication Skills module
- Research Purpose with Shraddha Analytical
- Research Purpose with University of Sydney
- Provide the Educational Material/Book to the Institute with Johnson & Johnson Pvt Ltd.
- Health Care Activity / Projects with IIT Mumbai
- Clinical Evaluation of Breath-Based Point of Care Test for Diagnosis of Pulmonary Tuberculosis with IKP Knowledge Park
- Promotion of Gandhian philosophy amongst faculty and students
- MGMIHS started publishing quarterly a peer-reviewed scientific journal, MGM Journal of Medical Sciences, indexed in Copernicus with IC value of 83.47 for 2015, Google Scholar, EBSCO, Genomics and many more indexing and abstracting sources of international repute.
- MGM SOP established a Centre for Human Movement Science with support from International Society for Biomechanics and Bioengineering; and Technology Incubation Centre, IIT, Mumbai.

2016-17

- Establishment of state-of-art Skills Lab, with initiation of AHA (American Heart Association) accredited BLS and ACLS courses
- Implementation of Communication Skills module
- Promotion of Gandhian philosophy amongst faculty and students
- MGMIHS adjudged the Best Deemed University by DNA, BBC Knowledge, and Star Group of Industries, 2017.
- MGMIHS approved for Indian Healthcare Excellence Award by Corporate Council for Leadership and Awareness, and Incredible India Foundation. (Award function on 13th May 2017).
- MGM Medical College and Hospital, Navi Mumbai adjudged the best medical institute in the Western Region of India by the Jury for LOKMAT National Education Leadership Award.
- MGM SOP Department of Mechanical and Materials Engineering, Queen's University, Canada; and S.N.D.T. Women's University, Mumbai, India engaged in inter-disciplinary project on pelvimetry to gain an insight in birthing positions which can be used, an initiative sponsored by Natural Sciences and Engineering Research Council, and Shastri Indo-Canadian Institute.
- MGM SOP, Navi Mumbai and World Spine Care signed an MOU to offer evidence-based care of global merit to underserved people with spine problems, and to pursue research addressing to the spine care needs of local population.

2017-18

- Formulation of Graduate Attributes
- Implementation of Choice Based Credit System in 31 programs
- Formulation of Course, Program and Program specific outcome based curricular framework
- Induction Programs for UG and PG students
- Gender Sensitization sessions for faculty, UG and PG students
- Faculty Development Programs like Conferences, CME, Workshops,
- Establishment of MGMIHS Bioethics Unit of UNESCO Chair in Bioethics
- Inclusion of Bioethics into UG and PG curricula
- Implementation of Communication Skills module
- Establishment of Health Profession Education Centre
- Promotion of Gandhian philosophy amongst faculty and students
- Academic and Administrative Audits (Internal and External)
- Implementation of various Government Programs like Unnat Bharat Abhiyan, Swatch Bharat Abhiyan Adoption of villages

2018-19

- Faculty Development Programs like Conferences, CME, Workshops, EDUCON 2018
- Implementation of Communication Skills module
- Promotion of Gandhian philosophy amongst faculty and students
- Monthly Academic and Administrative meeting jointly for Navi Mumbai and Aurangabad campuses
- Academic and Administrative Audits (Internal and External)
- Observation of Health Days, Yoga Day, Marathi Rajbhasha Divas
- Ten patents on research innovation filed during 2015-16 and all have been published.

MGMIHS CENTRE OF EXCELLENCE

1. **MGMIHS OMICS**
2. **MGMIHS Incubation and Innovation Centre**
3. **MGMIHS Sleep Medicine and Research Centre**
4. **MGM Centre for Human Movement Sciences**

MGMIHS OMICS RESEARCH CENTER

(A centre of excellence in drug discovery and molecular diagnostics)

Figure.1 MGMIHS OMICS Research Center

MGMIHS OMICS Research Center is a centre of excellence in drug discovery and molecular diagnostics.Center is accelerating the basic and applied research.Using various domains of OMICS such as genomics, proteomics and computational biology, this center is providing unique and exploratory platform for discovery research.

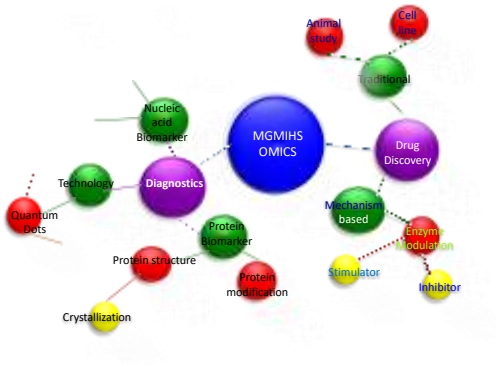


Figure.2 Various research domain of MGMIHS OMICS Research Center

Research and technology innovation of center is mainly revolving around the integration of advanced knowledge of protein science, enzymology, metabolic network, natural products chemistry, green synthesis etc. The thrust area of this centre i.e. biomarker discovery, rational drug discovery, nano-biotechnology, reversal of drug resistance and green technology.Presentlycentre is actively engaged in discovery and diagnostic research in the area of tuberculosis, malaria, obesity and disability.

Center is enriched withimportant instruments such as spectrofluorophotometer, UV-Vis Spectrophotometer, ELISA Reader, HPLC, Fume Hood, Laminar Air flow, Biosafety Cabinet, CO_2 Incubator, Thermal cycler, Gel Electrophoresis instruments, Inverted microscope, -20^{o}C refrigerator etc. and other large number of basic and small supportive instruments.Thiscentre is also equipped with protein isolation and purification. Centre is also equipped with an advanced proteome/protein based several bio-systems for bio-fabrication of metallic nanoparticles. Bio-fabrication based generation of quantum dots facility is major attraction of center.

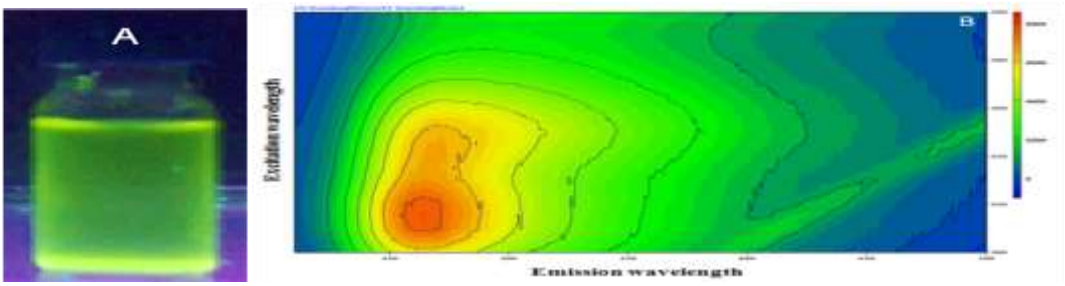


Figure.3.A.Photoluminescence of cerium oxide quantum dots under UV light B. 3D spectrum of cerium oxide quantum dots

In 2017-2018 major focus of the research was on biogenic quantum dots and its application for TB antigen IP-10, pancreatic lipase inhibitor based formulation for animal trial for anti-obesity effect, search for novel anti-diabesity plant/molecule (based on anti-pancreatic activity and glucosidase inhibitory activity). Center has also aggressively started working for a molecule for reversal of drug resistance in Plasmodium falciparum. Centre has successfully demonstrated application of biogenic quantum dots for Cerium quantum dot powered IP-10 antibody assembly for identification of TB antigen and developed detection kit.

Extraordinary work has been demonstrated in the area of anti-obesity formulation and its effect in animal model. Towards the search of anti-diabesity molecule novel plants has been identified. For reversal of chloroquine resistance in malaria, efflux pump like inhibitors are demonstrated in bacterial model. Under minor project, development of protein immobilized carbon for removal of arsenic from water and new plant leaf source for carbonic anhydrase (carbon capture potential) were very innovative work in this section. Centre continuously supported ongoing other projects such as Malaria and Mycobacterium tuberculosis. Papers have been also published in national and international journal. Centre is mainly working and advancing in the area of natural enzyme inhibitors.

Due to interdisciplinary research platform, center has provided facilities for various divisions of MGM medical college and hospital such as Ophthalmology, Pediatrics, Pharmacology, Biochemistry, Pathology and other unit of MGMIHS i.e. MGM School of Physiotherapy, MGM School of Biomedical Sciences and MGM Dental College and for research and training work. Centre has also supported Ph.D. Biotechnology program under MGMIHS, M.Sc. Molecular Biology (two years) program under School of Biomedical Sciences and MGMIHS Incubation and Innovation Centre.MGMIHSOMICS Research Center isani**nterdisciplinary synergy and it is also acting as central facility for MGMIHS research. Faculty, clinician, scientific staff and students are using this facility. Researchers of centre have been also awarded by various national and international organization/foundation. They have also**participated in various conferences and symposia.

MGMIHS Incubation and Innovation Centre

MGM Institute of Health Sciences, Navi Mumbai has recently established **Innovation & Incubation Centre** on 18th April 2018. In this direction, MGMIHS recognized/registered, Institution's Innovation Council on 17th November 2018 as per the norms and directions of Innovation Cell, Ministry of HRD, Government of India. Presently, MGMIHS Incubation and Innovation Centre is actively engaged in various ongoing R&D projects. This center is also supporting MGMIHS Institution's Innovation Council for implementation of various events/programs.

This centre is providing unique and interdisciplinary platform for creation of skill based new enterprises. Centre will incubate all our ideas and expertise for commercial exploration. Centre integrates various disciplines and expertise of MGM institute's such as medical sciences, physiotherapy, prosthetics and orthotic, nursing, biomedical sciences etc. Centre highlights all the available expertise for commercial exploration.

The thrust areas of Incubation and Innovation Centre are

1. Medical education and training,
2. Technology development and transfer,
3. Skilled manpower provider,
4. Expert consultancy,
5. Validation and human trial centre and
6. Innovative strategies provider for health science project.

MGMIHS Incubation and Innovation Centre is well connected with various laboratories of MGM institutes for basic and applied work with facilities including library, technical / IT Support, laboratory, workshop & testing facilities, research mentoring etc. Technology consultancy, training, potential business facilitation and network of mentors are also part of centre functioning.

MGMIHS Incubation and Innovation Centreare committed to facilitate the growth of innovators and entrepreneurs in achieving their goals. Therefore, this centre work with the mission to incubate innovative ideas by supporting the planning, development monitoring and training, create a multiplier effect on opportunities for innovator and entrepreneurs. Incubation of all available expertise for commercial exploration is another aim of the centre.

Therefore, followings are major objectives of MGMIHS Incubation and Innovation Centre;

- To boost the entrepreneurial spirit among stakeholders
- To accelerate discovery and research program
- To accelerate commercialization of R&D outputs and technology transfer
- To create skill based new system that can generate value-added jobs and services.

MGMIHS Incubation and Innovation Centreworks through well define project implementation protocol using various incubator modules.

- Pre-incubation is 1st step of implementation process which includes presentation of innovative idea, new strategy, new products, and new technologies and processes etc. Selection is another important step of project implementation which mainly deals with screening of applications, discussion on technical aspects, methodology of project implementation, financial & business plan of project etc.
- Incubation module of implementation process mainly focuses providing workspace, mentoring, funding support, administrative and specialized support, trainings etc. After the successful incubation of project post incubation module provides monitoring, linkages support, processes and networking support etc.
- 2 major platforms for these activities are i.e. Innovator @P which support entrepreneurs in launching and scaling their technology-based ideas and Accelerator @P whichconduct startup accelerator programs in collaboration with reputed national and international organizations to help accelerate the learning and growth of incubated start-ups.

In first phase centre has decided towork on bioprocess, nutraceuticals, biomedical device, and diagnostics related projects.

Activities:

Inauguration ceremony of MGMIHS Incubation and innovation center

MGMIHS Sleep Medicine and Research Centre

The MGMIHS Sleep Medicine and Research Center was inaugurated on the 6 of March 2014. Our center is in cooperation with the Sleep professionals at Penn Medicine, part of the University of Pennsylvania Health System, USA, recognized as one of the leading sleep medicine institutes in the world. With the training and guidance of Penn Medicine experts, our Center offers a full complement of sleep physician services, diagnostic testing and treatment options to ensure the best possible patient care. We offer beautiful and comfortable sleep facilities for overnight testing performed with state-ofthe- art equipment, similar to that used at Penn Medicine sleep centers in Philadelphia, USA. These efforts have resulted in the MGMIHS sleep program being specifically designed to meet the growing needs of the Indian population.

TYPES OF SLEEP DISORDER STUDIES

- Attended Polysomnography
- Attended Polysomnography with PAP titration
- Attended Multiple Sleep Latency Test /Maintenance of Wakefulness Test
- Unattended Home Sleep Study

SLEEP DISORDERS are common and increasing everyday in India. Many times sleep disorders are not recognized by the people who suffer from them, but the dangers are very real. Sleep disorders are increasingly becoming the most frequent reason for automobile accidents in India, and if left untreated, cause health related problems including heart attacks, strokes, and congestive heart failure, and can contribute to the severity of other diseases. People who suffer from sleep disorders may have SYMPTOMS of:

- Increased sleepiness during the day
- Restless limb movement while sleeping at night
- Difficulty in falling asleep without sleeping pills
- Reduction in concentration, memory, and attention
- Increased periods of urination during the night
- Inability to complete needed tasks at home
- Loud snoring that disturbs others around you
- Difficulty staying awake while driving

- Irritable behavior

The MGMIHS Sleep Medicine and Research Centre is catering to the needs of patients having any of these following disorders:

- PERIODIC LIMB MOVEMENT SYNDROME
- INSOMNIA
- OBSTRUCTIVE SLEEP APNEA
- NARCOLEPSY
- PARASOMNIAS
- SHIFT WORK DISORDER

The MGMIHS Sleep Medicine and Research Centre have a dedicated team of Physicians and Technologiest. This team is trained and guided by University of pensylvania.

MGM Centre for Human Movement Sciences

MGM Centre of Human Movement Science (MGMCHMS) was established by MGM School of Physiotherapy, Navi Mumbai in 2015 in collaboration with BETiC, IIT-B and International Society of Biomechanics to address an urgent need to integrate clinical biomechanics in Indian healthcare.

The center works towards a mission to provide people with movement analysis facilities following traumatic sports or mechanical injury or disorders such as stroke, amputations (loss of limb), and cerebral palsy, diabetic foot complications, Parkinson ’s disease, prevent injury and enhance sports and dance performance at an affordable cost for better treatment planning. The vision is to generate a task force within the country to undertake research and develop the science of movement analysis further in India by conducting integrated training for clinicians and engineers.

Team of MGMCHMS has grown to an in-house core team of 5 Physiotherapists; committed team of Mechanical engineers from IITB, Human movement scientists from Cardiff University, UK contributing with complementary skills on specific research projects. A

cohesive effort between healthcare professionals and engineers is a highlight of the team work at MGMCHMS resulting in translational healthcare research.

Inter-disciplinary collaborative research funded internally and extramurally is in process. Internally funded projects focus on exploration of biomechanical demands of Yogasanas, Suryanamaskar; traditional ground level activity such as squatting and classical dance form namely-Bharatnatyam. Our efforts continue to explore functional outcome of children with cerebral palsy undergoing single event multiple level surgery and develop a tool for home based monitoring of function. Pilot work is undertaken to study the stiffness of plantar cutaneous tissues among people with diabetic neuropathy for early detection of risk to injury. Preliminary work is also in progress to design simple tools to reduce fatigue of back muscles in mathadi workers.

A collaborative project between Department of Mechanical Engineering IIT Bombay and MGM School of Physiotherapy, Navi Mumbai aimed towards developing a powered trans-tibial prosthesis for people with below knee amputation; funded by Department of Biotechnology is in process. MGM School of Physiotherapy is working with Sancheti College of Physiotherapy, Pune to explore effectiveness of two modifications of traditional Suryanamaskar. Additionally research in healthcare is conducted by PhD scholars and post-graduate students of Physiotherapy and engineering which is complementary in nature.

Ongoing observer ship, guided tours and short-term demonstrations are conducted to spread awareness and knowledge of biomechanics within Maharashtra and outside among clinicians, students and faculty members of health care and engineering.

The center has offered 12 training courses in clinical biomechanics over 4 years which were received well by enthusiastic clinicians and engineers across Maharashtra, Gujarat, Karnataka and Kerala & Delhi. Participants reported an excellent feedback on knowledge base, awareness of applications of movement analysis in clinical care and academic programs.

Intense efforts to deliver a triad of clinical service, research and training programs in clinical biomechanics continue at MGMCHMS to meet the ultimate goal of addressing healthcare needs specific to Indian lifestyle.

Facility

- **Vicon motion capture system and AMTI force plates:**

MGM CHMS is equipped with 12 high end 240 fps optical cameras (Vicon, UK) and three force platforms (AMTI, USA) to measure kinematics and kinetics of human movement.

Vicon Polygon is an integrated visualization and report editing tool enabling quick and easy creation of a gait report. Polygon analyzes trial data that has been created with Vicon motion capture and processing software .It contains modeled data generated by Vicon biomechanical modeling software (such as Plug-in gait, bodybuilder and OLGA). AMTI biomechanics force platforms are designed to measure forces, moments and are sensitive to accelerations as well. Force plates can be used individually or arranged in a walkway format to collect multiple footfalls.

❖ **Novel e-med system for plantar pressure analysis:**

A platform system is available for plantar pressure analysis (novel emed). E-med® pedography platforms are accurateelectronic systems for recording and evaluating pressure distribution under the foot in static and dynamic conditions. Platform provides accurate, reliable information for the analysis of foot function and diagnosis of foot pathologies. Foot deformities and malfunction can be detected during analysis of the barefoot pressure data. It consists of calibrated capacitive sensors.

❖ **Fitmate:**

Fitmate Med by COSMED, Italy is an electronic device developed for assessing resting metabolism, cardio-respiratory fitness (VO2max) and basic spirometry (FVC, SVC, MVV). It allows personalized weight management programs and exercise prescriptions according to the ACSM's latest recommendations. It is sensitive equipment that provides accurate respiratory gas analysis and real time oxygen consumption. Energy expenditure of activity is computed and comprehensive analysis of cardio-respiratory and metabolic systems allows for monitoring treatment outcomes and prescription of evidence based activity.

❖ **Electromyography system:**

DelsysBagnoli EMG System: DelsysBagnoli EMG DSY-DS-B03 isa 8 channel wire-less device which can be connected to VICON software so that it is helpful in various range of biomechanical research activity such as muscle activity in gait cycle, sports biomechanics.

The ProComp Infiniti: The ProComp Infiniti SA7500 encoder is an eight (8) channel, multi-modality device for real-time computerized biofeedback and data acquisition. It has 8 protected pin sensor inputs with two channels sampled at 2048 s/s and six channels sampled at 256 s/s. The ProComp Infiniti encoder is able to render a wide and comprehensive range of objective physiological signs used in clinical observation and biofeedback. All sensors are completely noninvasive and require little or no preparation for use.

❖ **Step Activity Monitor:**

The Step Activity Monitor (SAM) by Orthocare Innovations is a highly accurate ankle worn ambulatory activity monitor, the size of a small pager. The StepWatch works with a docking station and software that handles stet-up, downloading, display, analysis, and many other functions. It detects steps for a wide variety of normal and abnormal gait style and cadence ranging from a slow shuffle to a fast run. It has a capacity to monitor and store data for a month. Exclusive feature of this facility is its open access to clinicians and engineers to engage in planning strategic work either for clinical service, research or training.

Research & Clinical services

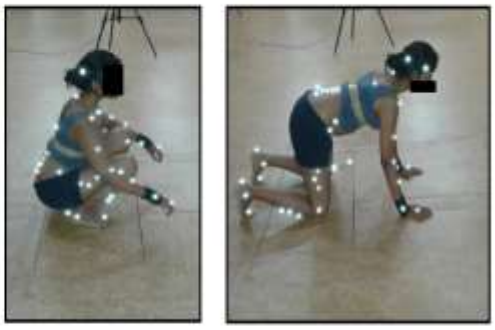
MGM Centre of Human Movement Science is committed to develop biomechanics in India in all 3 domains i.e. academic, research and clinical. MGM Centre of Human Movement Science teams did the tremendous work in all three domains. 350 consented healthy participants (aged between 5-75 yrs) were analyzed to generate normative reference data for Indian population and this is still ongoing. 171 patients have been tested 159 participants tested for our research activity.

MGM CENTRE FOR HUMAN MOVEMENT SCIENCE

Patient Care

3-D gait analysis of patients with
a) Cerebral palsy b) Amputation

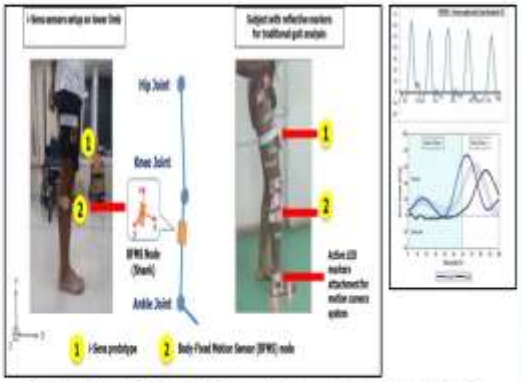
Research



The effects of labour and birth positioning on pelvic dimensions: gaining further insight to improve the birth experience

Training in clinical biomechanics

Technology validation



Experimental setup of i-Sens system and motion capture camera systems in gait labs

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