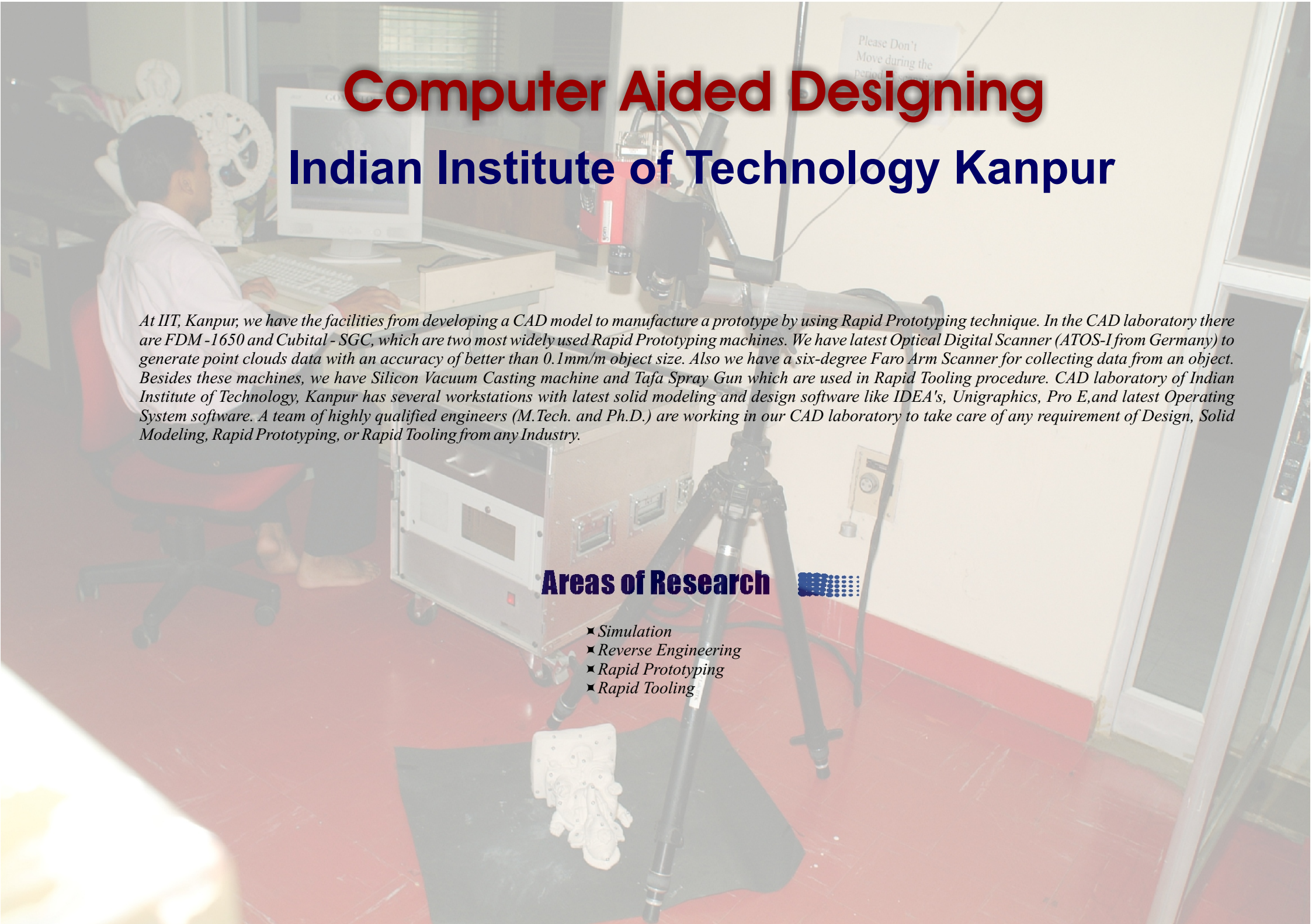
Computer Aided Designing

Indian Institute of Technology Kanpur



At IIT, Kanpur, we have the facilities from developing a CAD model to manufacture a prototype by using Rapid Prototyping technique. In the CAD laboratory there are FDM -1650 and Cubital - SGC, which are two most widely used Rapid Prototyping machines. We have latest Optical Digital Scanner (ATOS-I from Germany) to generate point clouds data with an accuracy of better than 0.1mm/m object size. Also we have a six-degree Faro Arm Scanner for collecting data from an object. Besides these machines, we have Silicon Vacuum Casting machine and Tafa Spray Gun which are used in Rapid Tooling procedure. CAD laboratory of Indian Institute of Technology, Kanpur has several workstations with latest solid modeling and design software like IDEA's, Unigraphics, Pro E,and latest Operating System software. A team of highly qualified engineers (M.Tech. and Ph.D.) are working in our CAD laboratory to take care of any requirement of Design, Solid Modeling, Rapid Prototyping, or Rapid Tooling from any Industry.

Areas of Research

- *Simulation*
- *Reverse Engineering*
- *Rapid Prototyping*
- *Rapid Tooling*

Books

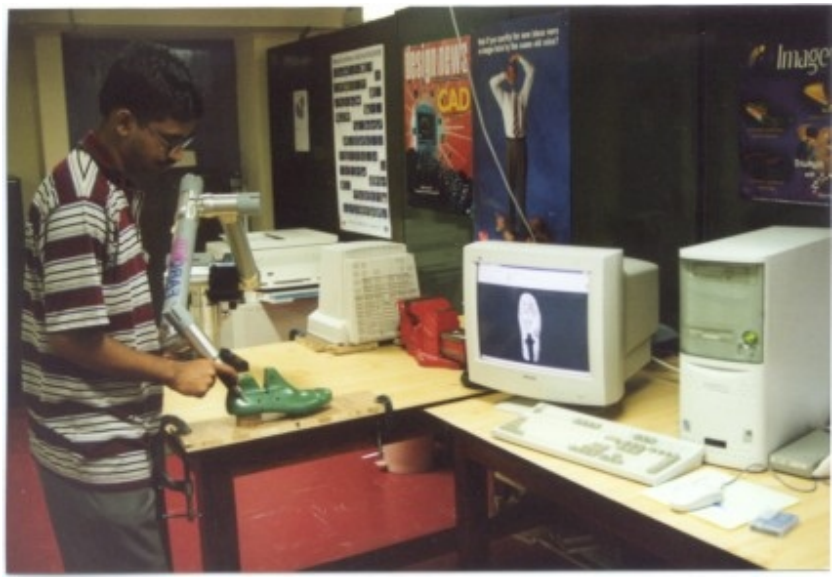
"Kinematics and Geometry of Planar and Spatial Cam Mechanisms", by *Sanjay G Dhande and J Chakraborty.*

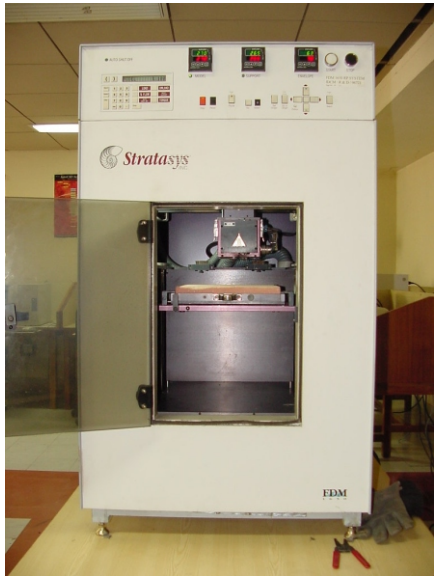
The book has been published by Wiley Eastern Ltd., New Delhi in 1977 and is being marketed by Wiley International Inc., New York.

"Computer Aided Design and Manufacture", by *Sanjay G Dhande and S Sampath* (editors)

The book has been published by the Committee on Science & Technology in Developing Countries (COSTED), Singapore and is based on the proceedings of an international seminar on "CAD/CAM - Implications to Development in Asia" held at COSTED, Madras, September 1986.

"Computer Aided Engineering Graphics and Design ", by *Sanjay G Dhande.*





Consultancy Projects

Numerous consultancy projects have been undertaken successfully in the areas of CAD, RP, RT, Graphics and Simulation by CAD Laboratory, IIT, Kanpur. To name a few

- ADA
- Bajaj
- DMSRDE under department of defense, Govt. of India.
- Eicher
- KBL
- LML
- HAL Bangalore, Koraput, Korwa, Lucknow, Kanpur
- Scooters India Ltd.
- Sanden Vikas
- Telco
- Tisco
- Maruti
- Deneb Robotics
- Mindahuff
- BHEL
- DIPP (Under Ministry of Commerce & Industry) Govt. of India

Sponsored Projects

Various projects have been executed in the fields of software development, in the area of CAD, Graphics, Simulation , Rapid Prototyping and Tooling, Reverse Engineering Techniques. To name a few -

- Computer Aided Geometric Methods for Development of Certain Classes of Ruled Surfaces
- On Concepts and Techniques of Interactive Motion Modeling
- Shape Design Using Intrinsic Geometry
- Geometric Modeling of Manufacturing Processes Using Symbolic and Computational Conjugate Geometry
- Geometric Modeling and Simulation of Non-traditional Manufacturing Processes
- Methodology Of Conceptual Design And Its Applications To LAWS Robots
- Shape Optimization Using Intrinsic Geometry and Boundary Element Method
- Shape Realization Using A Flexible Surface Tooling System
- Constrained Volumetric Nesting For RP Process
- Error Analysis and Calibration Methodologies For RP Process
- Geometrical Synthesis of Planar Curves Using Intrinsic Forms
- Optimal Design of Disc Cam Mechanisms
- Kinematic Analysis of Constant-breadth Cam-Follower Mechanisms
- Computer-aided, Interactive Graphical Design of Machine Tool Gearboxes
- Design and Implementation of a Contour Plotting Package
- Computer-aided Methods for Development of Surfaces
- Generation and Display of Conjugate Surfaces Using Computer Graphics
- Camouflage Pattern Generator
- Design and Implemented Design of Progressive Dies and Their Strip Layout
- Design and Implementation of a Graphics Package for Cartography and Sand Model Displays
- Generation and Display of Intersection Curves Between Geometrical Solids
- Design and Implementation of GDB-10, Data Base Design
- Design and Implementation of GDB-10, Data Definition Language, DL
- Design and Implementation of GDB-10, Data Manipulation Language, OL
- Computer-aided Navigation of a Ship in a Harbour
- Query Processing for Military Maps and Sand Models - Graphical Queries
- Query Processing for Military Maps and Sand Models - Non-graphical Queries
- Optimal Design of R-S-S-R Linkages with Applications to Steering Mechanisms
- Generation and Display of Dynamically Symmetric Geometric Patterns
- Computer Aided Design of Electric Overhead Traveling Cranes
- Computer Aided Design of Automotive Leaf Springs
- Computer Aided Geometric Design of Overhead Chain Conveyor System
- Computer Aided Design and Analysis of Gear Box Shafts
- Design and Implementation of a Graphics Package in SIMULA, Part I
- Design and Implementation of a Graphics Package in SIMULA, Part II
- Computer Aided Design of Gear Hobs
- Computer Aided Layout Design of Garment Patterns
- Design & Implementation of a Structured Language for Picture Generation, Part I - Compile-time Features
- Design & Implementation of a Structured Language for Picture Generation, Part II - Run-time Features
- Elastodynamic Analysis of a Cam-modulated Mechanism
- Computer Aided Design of Progressive Dies and Their Strip Layout
- Interactive Computer Aided Design of Steering Systems
- Computer Aided Design of Some MOS LSI/VLSI Functional Modules
- Computer Aided Mask Layout Design for Bipolar Integrated Circuits
- Computer Aided Interactive Analysis of Pipeline Networks
- Design of a Microprocessor-controlled Five-axis N C Machine
- Computer Aided Interactive Simulation of an Airwar Game Model
- Optimal Design of a Single Point Turning Tool and Computer Graphics Simulation of the Chip Formation Process
- Geometric Modeling Using Superquadrics
- Interactive Simulation of Air Combat
- Computer Aided Nesting of Irregular Shapes
- Implementation of a Shape Grammar and Related Arithmetic Algorithms
- Computer Aided Simulation of a Mine-field War Game Model
- Interactive Simulation of Anti-aircraft Guns
- Computer Aided Design of Work Dependent Cams for Single Spindle Automatic Machines
- Design and Implementation of a Surface Modeling Package
- Development of an Algorithm for Interactive Planar Mesh Generation Using Vornoi Diagram Technique
- Design & Implementation of a PC-based Part Programming Package for Planar Machining Operations
- Design of a War Gaming Package Using GOSIL - Graphics Oriented Simulation Language
- Symbolic and Computational Conjugate Geometry for Design and Manufacturing Applications
- Development and Implementation of an Algorithm for Computer Aided Process Planning Using DSG
- Design and Implementation of Parallel Algorithms for Mesh Generation Schemes
- Methodology of Design for Manufacturability of Fiber laminate Components
- Trajectory Planning Using Intrinsic Geometry
- On Two Dimensional Nesting Problems
- Path Planning Over Natural Terrain Using Digital Terrain Model
- Mechanical Error Analysis of Teleoperated Robots
- Configurational Design and Graphical Simulation of LAWS Robot for Fuel Tank Cleaning
- Development of a Computer Aided Adaptive and Variant Design Technique
- Computer Animation of Conjugate Surfaces
- Diagnostics of Peripheral Milling Process Using Methods of Time Series Analysis
- CNC Code Generation for Ruled and Sculptured Surfaces Using Envelope Theory and Conjugate Geometry
- Geometric Modeling of a Cloth Droping System
- Graphical Simulation of Cutter Path Using Symbolic Conjugate Geometry
- Design and Flat-pattern Development of Transition Surfaces
- Kalki: A Human Body Animation System
- Multi-objective Optimization Using Nondominated Sorting in Genetic Algorithms
- Computer Animation and Simulation of Indian Asanas
- Development of Surfaces - An Integrated Approach
- Optimal Design of B-Spline Curve and Surface
- Geometric Modeling of Single-point Cutting Tools For Grinding and Sharpening
- Computational Issues in Rapid Prototyping of Free-form Surfaces
- Development of Autoconjugate for Helical Machining
- Constraint-based Nesting of Flat Patterns
- Geometric Modeling of Single-point and Fluted Tool Surfaces
- Optimal Design of Pseudo-intrinsic Surfaces Using Genetic Algorithm Technique
- Photoelastic Coating Analysis of Rapid Prototype Models
- Three-dimensional Photoelastic Analysis of Rapid Prototype Models
- Application of SGC-RP Technique For Development of Aerodynamic Models
- Application of SGC-RP Technique for Development of Hydrodynamic Models
- Development of Reverse Engineering Methodology for Engineering and Footwear Components
- Development of Saddle tree (Under Ministry of Commerc & Industry)

Faculty

Prof. S G Dhande : Professor (ME & CSE)

Research Interest : Engineering Design & Manufacturing, Reverse Engineering, Rapid Prototyping & Rapid Tooling, CAD/CAM, Computer Graphics & Computational Geometry, Kinematics & Dynamics of Mechanisms

Dr. A Chatterjee : Sr. Research Engineer & Coordinator, Cad Laboratry

Research Interest : Geometric Modeling, Rapid Prototyping, CAD, Image Processing, Computer Graphics

Contact

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