

PROGRAM FOR ICRPM 2002 BEIJING
2nd International Conference on
Rapid Prototyping and Manufacturing
(ICRPM 2002 Beijing)

Xijiao Hotel, Beijing, China, August 19 & 20 2002

Sponsored and supported by: National Natural Science Foundation of China (NSFC)
Chinese Mechanical Engineering Society (CMES)
Organized by: Chinese Rapid Forming Technology Committee (CRPTC)
Center for Laser Rapid Forming (CLRF) of Tsinghua University

Sunday, August 18

Evening: 7:00pm-9:30pm
GARPA Annual Meeting, Global Summit 2002 East Garden Restaurant
Development of RP and RM in the world in 21 century
Chairman: T. T. Wohlers

Monday, August 19

Morning 8:00am-12:00am
Opening Ceremony Report Hall
8:00am-10:00am
Chairman Prof. I. Gibson (Advisor of GARPA)
Seat in the front row of the rostrum:
Academician & Prof. Zengyuan Guo Academician & Prof. Weidou Ni
Prof. S. Scott Crump Prof. Hagiwara Tsuneo
Prof. K. Maekawa Prof. J. R. G. Evans
Prof. Yongnian Yan Prof. Tianhu Song
Prof. Zhiyao Wang Prof. Yuanzhong Lei
Mr. T. T. Wohlers Prof. I. Gibson
Opening Speech (8:00-8:20) Academician & Prof. Zengyuan Guo (China)
Keynote Address (8:20-9:50)
T. T. Wohlers (USA, Advisor) Prof. K. Maekawa (Japan)
Prof. S. Scott Crump(USA)
8:20-8:50 T. T. Wohlers: Rapid Prototyping & Tooling State of the Industry
8:50-9:20: K. Maekawa: Three-dimensional powder fabrication by laser sintering
9:20-9:50 S. Scott Crump: Advances in materials and building platform for fused deposition modeling

Tea Break: 9:50am-10:20am Visiting Exhibition (Exhibition Hall)
**3D Systems Co., Stratasys Co., SOMOS Co., CMET Co., Beijing Yinhua Co., DSM Co.,
Fraunhofer IPA Co., Shanghai Liantai Co., Tech/TA Helsinki Univ., Yantai Taili
Co. and so on**

10:20 am -12:00 am Invited Papers
Chairman Prof. S. S. Crump (USA)
Yongnian Yan (China) J. R. G. Evans (UK)
Hagiwara Tsuneo (Japan) I. Gibson (HK)
G. C. I. Lin (Australia)
10:20-10:40 Yongnian Yan, Renji Zhang, Qingping Lu, Feng Lin, Rendong Wu and Zhuo

Xiong: The elementary introduction of rapid manufacturing
 10:40-11:00 J. R. G. Evans and Shoufeng Yang: Acoustically induced powder dispensing and metering
 11:00-11:20 Hagiwara Tsuneo and Morikawa Fumi: Recent progress of RP resins and systems by CMET INC.
 11:20-11:40 I. Gibson, W.L. Cheung, F.P.Y. Ting, W.M. Ling, H.C.H. Ho, J.C.W. Ku : Multiple material polymer systems based on the selective laser sintering process
 11:40-12:00 G. C. I. Lin, Hsuan-kuan Huang, and Sang-heon Lee: Multi-axis prototyping with a dual-robot system

Afternoon

2:00pm-4:00 pm

Section 1:

Conference Room No.1

Co-Chairmen

K. H. Lee (Korea)

Bingheng Lu (China)

2:00-2:20 A. Gatto, E. Bassoli: Impact of time compression techniques on spotlight production
 2:20-2:40 Zhengying Wei, Yiping Tang, Wanhua Zhao and Lu Bingheng: Progress status and rapid development technique of drip irrigation emitter
 2:40-3:00 S.S.Zhang, X.L.Bai, H.C.Yang, Y.Q.Chen, B.Gao, S.J.Xiao and Z.Y.Qiu: CAD modeling in dental prosthesis's RP manufacturing
 3:00-3:20 Yanbo Hui and R. I. Campbell: An application of real-time motion capture system on reverse engineering
 3:20-3:40 Jingyi Li, Xuewen Xiao, Yong Wu, Jie Zhou and Zhongyuan Zhang: The development and application of non-linear FEM for large plastic deformation of sheet-forming
 3:40-3:50 Hongtao Gao, Peng Qi, Yongnian Yan and Qingping Lu: Data processing technology in rapid prototyping system
 3:50-4:00 Wei Li, Yongnian Yan, Ge Guo: Automatic generation of toothed support structure in layered manufacturing

Section 2:

Conference Room No. 2

Co-Chairmen:

Yinghui Huang (China)

Mike Bailey (USA)

2:00-2:20 Hwa Hsing Tang, Fwu Hsing Liu, Hsin Hung Huang and Jen Sheng Lee: Ceramic Laser Fusion
 2:20-2:40 C.W. Ku, I. Gibson, W.L. Cheung: The effect of alcohol on processing of DuraForm™ polyamide using the selective laser sintering process
 2:40-3:00 Mike Bailey: A portable graphics program for rapid prototyping file display, repair and interchange
 3:00-3:20 D.J. Dcosta, F. Lin, W. Sun, T. El-Raghy: Integrated fabrication process and layered manufacturing of fully dense Ti₃SiC₂ powder-based structures
 3:20-3:40 Lianhong Zhang, Shuangyi Li, Baofeng Zhang and Xiaoming Xiong: A Electric or Magnetic Field Deflection-Projection Based Novel Rapid Prototyping Technique
 3:40-4:00 Dror Danai: PolyJet technology-a new paradigm for rapid prototyping

Section 3:

Conference Room No. 3

Co-Chairmen:

D. Dimitrov (South Africa)

J. R. G. Evans (UK)

2:00-2:20 Lee Chee Wai, Chua Chee Kai, Cheah Chi Mun: Rapid sheet metal manufacturing direct and indirect rapid tooling
 2:20-2:40 Mohammad Masoud Mohebi and Julian R. G. Evans: Solid freeforming of functionally graded materials and combinatorial libraries
 2:40-3:00 Baohua Guo, Xi Chen, Ning Zhou and Tao Feng: Study on polymer applied in

- selective laser sintering
- 3:00-3:20 Qiang Han and Yong He: The control of electrolysis discharge condition in wire electrical discharge machining
- 3:20-3:40 Jin Zhang, Shuping Yi, Jin Ha, Lihong Lin: Study on joining process for laminated object manufacturing using metal as modeling materials
- 3:40-3:50 Haoying Zhou, Renji Zhang and Rendong Wu: FEM analysis of the influence of chamber temperature on MEM forming quality
- 3:50-4:00 Chen Sheng, Zhang Renji and Yan Yongnian: Technology study and improvement on large-scale Slicing Solid Manufacturing (SSM)

Section 4: Conference Room No. 4

Co-Chairmen: A. A. Tseng (USA) G. C. I. Lin (Australia)

- 2:00-2:20 Cheah Chi Mun, Chua Chee Kai, Leong Kah Fai, Cha Siew Weng, Cheong Chee How and Chua Su Wen: Development of a scaffold structure library and assembly method for rapid prototyping
- 2:20-2:40 J. Nam, S. Dimovski, F. Lin, W. Sun: Rapid Prototyping Assisted Medical Modeling
- 2:40-3:00 Zhuo Xiong, Yongnian Yan, Yunyu Hu, Shenguo Wang, Renji Zhang and Chao Zhang: Layered manufacturing of tissue engineering scaffolds via multi-nozzle deposition
- 3:00-3:20 Xiaochen Fei, Yongnian Yan and Zhuo Xiong: Scaffolds fabricating and the application of RP in bone tissue engineering
- 3:20-3:40 Jimin Chen, Yingna Wang, Xubao Wang, Qiang Wu and Tiechuan Zuo: Laser rapid prototyping system based on 6-axis robot
- 3:40-3:50 Lifeng Chen Yongnian Yan Renji Zhang: Analysis of the depositing forming process based on Laser-Guided Direct Writing
- 3:50-4:00 Weiguo Zheng, Yongnian Yan and Zhuo Xiong: Modeling and designing gradient tissue engineering scaffolds with heterogeneous materials

4:00-4:30 Tea Break: Visiting Exhibition

Afternoon 4:30pm-6:10 pm

Section 1: Conference Room No. 1

Co-Chairmen: K. H. Lee (Korea) Bingheng Lu (China)

- 4:30-4:50 Hong-Seok Byun, Haeng-Jae Shin, and Kwan H. Lee: Design of benchmarking part and selection of optimal rapid prototyping processes
- 4:50-5:10 Liang-Chia Chen: A novel digitizing approach for ensuring surface reconstruction accuracy
- 5:10-5:30 Seokbae Son, Seungman Kim, and Kwan H. Lee: Laser scan planning for multi-patched freeform shape parts
- 5:30-5:50 Yugui Li, Qingxue Huang, Guangxian Shen and Hong Xiao: Simulation of strip polling by elastoplastic contact BEM with friction
- 5:50-6:10 Naifei Ren, Tao Ma, Chuanyu Gao and Lan Cai: The study of subarea spiral scanning path based on SLS

Section 2: Conference Room No. 2

Co-Chairmen: Yinghui Huang (China) Mike bailey (USA)

- 4:30-4:50 Yaxiong Liu, Dichen Li, bingheng Lu, Sanhu He and Gang Li: The custom-made mandible substitute based on rapid prototyping
- 4:50-5:10 Wenji Xu, Tao Wang, Tengcai Ma and Xiaobing Liu: Study on plasma spray

forming with speeded-up nozzle
 5:10-5:30 Chao Feng, Jenny Gim Ching Ang, Chee Chua Kai and Chi Mun Cheah: Warpage reduction in MMII-fabricated investment casting patterns
 5:30-5:40 Dazhong Wei, Jian Xu, Wei Lu: The developments of desktop rapid prototyping (RP) system MEM200
 5:40-5:50 Ming Xue, Yongnian Yan and Renji Zhang: Study on rapid prototyping technology of chemical deposition
 5:50-6:10 Xiufeng Wang, Hongjie Luo, Hongtao Jiang, Shanyong Mu: A photo-thermal flat materials rapid prototyping technology

Section 3: Conference Room No. 3

Co-Chairmen: D. Dimitrov (South Africa) J. R. G. Evans (UK)

4:30-4:50 Jack Y.C.Lin: Development of high efficiency/low noise industrial fan with RPD technology
 4:50-5:10 Jipeng Xu, Haiou Zhang, Guilan Wang and Biao Cao: Additive fabrication of metal parts based on plasma deposition manufacturing (PDM)
 5:10-5:30 Dimitar Dimitrov: Rapid prototyping and manufacturing using 3D printing technology
 5:30-5:50 Guangfu Liu and Aiping Li: Research of a new screw extruder for fused deposition process
 5:50-6:10 J.F. Zhao, J.H. Zhang, C.Y. Yu and Y.H. Huang: EDM electrode manufacturing with SLS and its machining capability

Section 4: Conference Room No. 4

Co-Chairmen: A. A. Tseng (USA) G. C. I. Lin (Australia)

4:30-4:50 Jong-I Mou and Ampere A. Tseng: Integrated Solid Freeforming of Metal Parts
 4:50-5:00 Dingjun Zhang, Renji Zhang and Yongnian Yan: Important role of rapid prototyping technology in mass customization
 5:00-5:10 Jian Xu, Yongnian Yan, Rendong Wu and Wei Lu: Compensating arithmetic on shrink and offset of MEM prototype
 5:10-5:30 Xiufeng Wang, Hongjie Luo, Fen Wang, Hongtao Jiang, Shanyong Mu: Dedao zun scientifically and artistically designed and rapid prototyped
 5:30-5:40 Chao Feng, Yongnian Yan, Renji Zhang and Chee Kai Chua: Finite element analysis of the solidification process in rapid ice prototyping
 5:40-5:50 Peng Qi, Hongtao Gao, Renji Zhang, Yongnian Yan and Qingping Lu: Data processing in rapid prototyping of medical model
 5:50-6:10 Yi Zhao, Libing Liu and Minghui Li: Laser-induced chemical deposition generated three dimensional microstructures

Evening: 8:00pm-9:30pm
Sightseeing of Beijing Night Beijing TV Tower

Tuesday, August 20

Morning 8:00am-10:00 am

Section 1: Conference Room No. 1

Co-Chairmen: D. J. Mickish (USA) Z. Dong (Canada)

8:00-8:20 Zhongguo Li, Michael Graham, Dean Robinson: Point cloud to Surface best-fitting
 8:20-8:40 Xiaorong You and Danie J. Mickish: Recent Advances in Stereolithography Resins

- 8:40-9:00 Zhanyao Yang and Xuerang Wang: Study of the rapid manufacturers for virtual die and mould
- 9:00-9:20 Yuqin Jia, Peixia Wang and Xianguo Yan: Pre-processing technologies for rapid prototyping and reverse engineering
- 9:20-9:40 Chuanyu Gao, Xiujuan Yu, Naifei Ren, Xiaodong Xu and XiaoWang: Research and development of remote control systems for rapid prototyping machine
- 9:40-10:00 Z.Dong, M. L. Perry, K. Kratschmar and R. Zheng: Combining screen-printing layer deposition technique

Section 2:

Conference Room No. 2

Co-Chairmen: **W. Michiels (Malaysia)** **J. V. Sloten (Thailand)**

- 8:00-8:20 Wei Lu, Qingping Lu, Rendong Wu and Jian Xu: Research on RP concept modeler
- 8:20-8:40 Wim Michiels: STL based rapid tooling for mould&die productivity
- 8:40-9:00 K. M. Fan, W. L. Cheung and I. Gibson: Fusion behaviour of glass filled true form during selective laser sintering
- 9:00-9:20 Jiquan Yang, Liya Hou and Weiyi Zhang: A study on part distortion of desktop rapid prototyping system
- 9:20-9:40 Jilin Ye: Rapid manufacturing using advanced laser sintering technology
- 9:40-10:00 Kriskrai Sitthiseripratip, Philip Oris, Banchong Mahaisavariya, Jintamai Suwanprateeb, Hans Van Oosterwyck, Jos Vander Sloten and Erik Bohez: Finite element study of a trochanteric Gamma nail (TGN) for a trochanteric fracture: Visualization of the 3D stress distribution patterns by means of a multi-coloured 3DP model

Section 3:

Conference Room No. 3

Co-Chairmen: **K. Maekawa (Japan)** **Jianhua Mo (China)**

- 8:00-8:20 Lei Zhang, Yizhuo Zhang, Guolin Tang, Sheng Chen and Yongnian Yan: Form large-sized model using melted extrusion manufacturing
- 8:20-8:40 Peikang Bai, Shuhuai Huang, Jun Cheng and Jingzhi Dang: Study on selective laser sintering of polymer-coated metal powder
- 8:40-9:00 Yu sheng Shi,, Jigan Liu, Daosheng Cai and Shuhuai Huang: The intelligent layout of the selective laser sintering technics
- 9:00-9:20 Jian-feng Zhang, Jian-feng Zhao, Yi-fu Shen, Yin-hui Huang and Chen-ye Yu: Direct selective laser sintering of Ni-based metallic powder s
- 9:20-9:30 Jian Xu, Yongnian Yan, Rendong Wu and Weiguo Zheng: The importance of software interface in RP technology
- 9:30-9:40 Zhongde Shan, Yongnian Yan, Renji Zhang and Da Yuan: Rapid substrate manufacturing process from rapid prototyping
- 9:40-10:00 Yusheng Shi, Xilong Lu, Naiyu Huang, Zitian Fan and Shuhuai Huang: Technology of rapid tooling based on rapid prototyping

Section 4:

Conference Room No. 4

Co-Chairmen: **Renji Zhang (China)** **J. Tuomi (Finland)**

- 8:00-8:20 Jukka Tuomi, Lotta Lamminen and Jussi Kanerva: Effects of the latest developments of the rapid tooling and manufacturing technologies on companies' product development processes
- 8:20-8:40 Hongyi Yang, Zhuo Xiong, Yongnian Yan and Renji Zhang: The structure and properties of porous scaffolds for bone tissue engineering fabricated via low-temperature deposition
- 8:40-9:00 Tingchun Shi, Da Yuan, Renji Zhang, Yongnian Yan and Qingping Lu:

Customized rapid manufacturing bio-functional parts-scaffold of auricular cartilage for macrotia
 9:00-9:20 Jie Liu, Jianhua Mo and Shuhuai Huang: Rapid manufacturing of complex shape sheet metal parts
 9:20-9:40 Jialin Yang, Shangzheng Li, Yang Wang and Wenrong Huang: Development for metal powders selective laser sintering equipment
 9:40-10:00 Renji Zhang, Yongnian Yan, Zhongde Shan, Feng Qi and Da Yuan: Rapid metallic mould manufacturing with plasma spraying layer based on rapid prototyping

10:00-10:30 Tea Break:

Visiting Exhibition

Morning

10:30am-12:10 am

Section 1:

Conference Room No. 1

Co-Chairmen: **D. J. Mickish (USA)** **Z. Dong (Canada)**

10:30-10:50 Cynthia Sexton, Grier C.I. Lin and Sang-Heon Lee: Modeling of a robot/CNC rapid prototyping system
 10:50-11:10 Manyuan Zhou, Juntong Xi and Junqi Yan: Representation and processing of heterogeneous object for rapid prototyping
 11:10-11:30 Weiyin Ma, Wing-Chung But and Peiren He: Implementation of adaptive slicing and selective hatching algorithms on a FDM rapid prototyping machine
 11:30-11:50 Hongqi Yang: New technology of local reverse engineering
 11:50-12:10 Cynthia Sexton, Grier C.I. Lin, Sang-Heon Lee: Modeling of a robot/CNC rapid prototyping system

Section 2:

Conference Room No. 2

Co-Chairmen: **W. Michiels (Malaysia)** **J. V. Sloten (Thailand)**

10:30-10:50 Philip Oris, Kriskrai Sitthiseripratip, Jintamai Suwanprateeb and Jos Vander Sloten: The cost-effective production of custom biocompatible implants by rapid prototyping – rapid tooling : an experience of 21 cases in Thailand
 10:50-11:10 Jingzhi Dang, Jun Cheng, Peikang Bai and Jianmei Zhang: Study on prototype sintering powder material (STPI) and its sintering process
 11:10-11:30 Yizhuo Zhan, Dazhong Wei and Rendong Wu: Multisensor-based monitoring system for MEM
 11:30-11:50 Peikang Bai, Shuhuai Huang and Jun Cheng: High efficiency selective laser sintering system
 11:50-12:10 Neil Hopkinson and Candice Majewski: Direct metal laser sintered tooling for injection moulding – assessing the effect of finishing on the ease of part ejection

Section 3:

Conference Room No. 3

Co-Chairmen: **K. Maekawa (Japan)** **Jianhua Mo (China)**

10:30-10:50 Masamitsu Takami: The key technology of the vacuum casting method
 10:50-11:10 Wei Jiang and Zhixiang Xu: Numerical Prediction of Thermal Stresses in Direct Metal SLS Process
 11:10-11:30 Hiroyuki Amino, Yan Lu and Trent Maki: Dieless NC forming prototype of automotive service parts
 11:30-11:50 Qinggang Wang, Yongnian Yan, Chao Feng and Rendong Wu: The real-time flux control system of ice prototyping
 11:50-12:10 Weidong Yang, Yongnian Yan, Dan Xu, Shujie Wang and Lei Zhai: An improvement on jetting method in PCM technology

Section 4:**Conference Room No. 4****Co-Chairmen: Renji Zhang (China) J. Tuomi (Finland)**

10:30-10:50 Yongnian Yan, Weiguo Zheng, Qingping Lu, Tianyue Zhu, Zhenning Li: Case study: rapid prototyping in clinical applications

10:50-11:10 Sen-chang Chen: Direct fabricating metal parts using SLS

11:10-11:30 Xiaoming Yang, Guimei Hao and Youming Bi: Research in detecting cracks on the surface of continuous casting slabs

11:30-11:50 Guangxin Tang, Renji Zhang and Yongnian Yan: Study on the skull-absent substitute manufactured by the MEM technique

11:50-12:10 Jie Yu, Lei Lin and Zihua Zhang: The apply of RP technology in rapid manufacturing of car body

Afternoon**2:00pm-6:00pm****(1) 2:00pm-4:00pm****Report Hall****Closure: Invited Speech of Some RP Companies****Chairman**

T. T. Wohlers (USA)

Introduction to GARPA Meeting

Prof. I. Gibson (Advisor of GARPA)

Free Speeches and Discussions

Closing Speech : Yongnian Yan (China)

(2) 4:00pm-6:00pm**Visiting Tsinghua University**

Chairman

Yongnian Yan (China)

Guiders: Prof. Renji Zhang

Prof. Qingping Lu

Associate Professor Feng Lin

Lecturer Rongdong Wu

Lecturer Zhuo Xiong

Evening:**7:00pm-9:30pm****Banquet****East Garden Restaurant**