出國報告（出國類別：出席國際會議）

參與 CAD'15 國際研討會報告

服務機關：國立中正大學 精密模具研究中心

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出國期間：104年6月19日至104年6月25日

報告日期：104年9月11日

一、 內容摘要

本報告說明參與CAD'15國際研討會之目的、經過、心得與建議。CAD'15國際研討會為CAD/CAM之新技術交流，本次會議舉辦地點為英國倫敦格林威治大學。本實驗室在此次研討會中發表一篇論文,論文題目：NC Simulation for Adaptive Look-Ahead Interpolator with On-line Collision Detection(自適應預視插補之線上防碰撞系統研究)，並與指導教授姚宏宗教授一同前往報告。

目次

二、　目的

　　本次會議目的於發表一篇論文，論文題目：NC Simulation for Adaptive Look-Ahead Interpolator with On-line Collision Detection(自適應預視插補之線上防碰撞系統研究)，並於世界各國CAD/CAM專家討論相關關鍵技術，亦有不錯收穫。

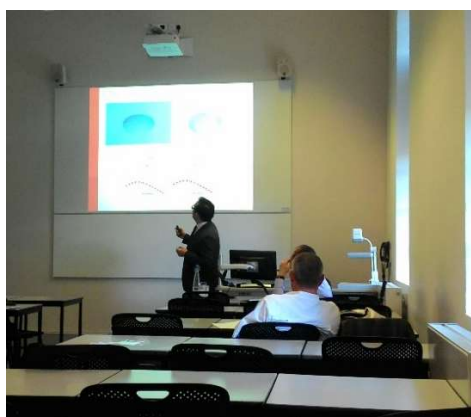CAD'15 報到處剪影

三、 過程

　　報告者於會議前兩天抵達英國倫敦，並為接下來的會議準備。報告者於會議第一天抵達英國倫敦格林威治大學，並預計於下午第三場次進行報告。在報告過程中，與各國學者討論本次發表論文內容，並獲得相關建議，有助於本研究的進行與後續改進之方向。

與指導教授參加CAD'15研討會於英國
格林威治大學

會議報告現場 Ⅰ

會議報告現場 Ⅱ

報告論文資訊

專題演講現場

專題演講現場

在本次會議中，報告者也參與其他場次的演講，演講題目為：What is Important

for Innovation: Skills, Experiences and Environments(對創新而言，什麼是最重要的? 技術、經驗與環境)，由美國普渡大學Dutta教授演講，針對如何建立一個環境與技術的傳承，使更多學生進行創新與技術改進。

在會議期間，報告者也參加其他場次，包含機器人與彈性製造系統(Robots and flexible manufacturing system)及逆向工程(Reverse engineering)等論文發表。在機器人的研究上，可看到國外除了在傳統機械手臂的設計上，有針對如何避開障礙物也有許多的研究。在逆向工程的發展部分，由傳統的探針接觸，改良到只需使用建幾張照片，就可建立完整的數位模型。

四、 心得

本次參加CAD'15研討會心得分為下列幾點：

(一)本實驗室CAD/CAM技術發展：

本次會議中報告本實驗室所開發之技術，受國外學者的肯定，並提出相關的研究建議與方向，有助於後續相關技術的開發與改進．

(二) CAD/CAM技術發展

本次會議中，報告者也參與其他場次的論文報告，包含機器人與彈性製造系統及逆向工程等，有助於了解未來CAD/CAM系統之發展，同時也可從中搜尋本實驗室未來可建立之關鍵核心技術。

(三)語文能力之強化：

本次會議中，除了吸收相關CAD/CAM技術之外，也可以鍛練英文口語能力，使報告者提升使用英文簡報之能力，並可增加報告者的見聞，提升國際的視野。

五、 建議

　　本次會議中，世界各國仍然在改善CAD/CAM技術，並增加其運用之領域。國內目前使用的CAD/CAM系統大多為國外的系統，使台灣變成國外系統商的殖民地，缺少自主的關鍵核心技術。有鑑於此，應增加相關CAD/CAM技術之開發，有助於產業的自主化。

附件一 展會議程

Monday, 22 June 2015

| 8:30-9:00 | ☑ Opening remarks (Queen Anne Court Howe Lecture Theatre 080) |
| | Chair:Les A. Piegl |

| 9:00-10:00 | ☑ Keynote: CAD CAM: An Aerospace Perspective, Clive Simmonds, BAE Systems, USA (Queen Anne Court Howe Lecture Theatre 080) |
| | Chair:James Gao |

| 10:00-10:30 | ☑ Coffee break (Council Room 063) |

10:30-12:00	Queen Anne Court Howe Lecture Theatre 080	QAC Room 038	QAC Room 039
	☐ **Geometric processing**	☐ **3D printing**	☐ **Virtual reality**
	Chair:Masaji Tanaka	Chair:Jill Urbanic	Chair:Umberto Cugini
	Interface Management For Automating Finite Element Analysis Workflows Christopher Tierney; Trevor Robinson; Cecil Armstrong	*Design Rules For Building Large, Complex Components Using The Fused Deposition Modelling Process* Jill Urbanic; Robert Hedrick	*Visuo-tactile System For 3d Digital Models Rendering* Alessandro Mansutti; Mario Covarrubias Rodriguez; Giandomenico Caruso; Monica Bordegoni; Umberto Cugini
	Ifog: Inductive Functional Programming For Geometric Processing Masaji Tanaka; Yuki Takamiya; Naoki Tsubota; Kenzo Iwama	*An Algorithm For The Detection Of 3d Scanning Direction Using Virtual Holes* Jiwoong Oh; Sang Chul Park; Min soo Ko; Kang hoon Cho	*Integrating Scents Simulation In Virtual Reality Multisensory Environment For Industrial Products Evaluation* Marina Carulli; Monica Bordegoni; Umberto Cugini
	A Web-based System To Describe And Execute Shape Processing Workflows Marco Attene; Daniela Cabiddu; Stefano Gagliardo; Franca Giannini; Marina Monti	*From Thought To Thing: Using The Fused Deposition Modeling And 3d Printing Processes For Undergraduate Design Projects* Jill Urbanic	*Simulating The Approach-retract Phenomenon Of Afm In Virtual Environment With Haptic Interface* Ke Liu; Xiaobo Peng

| 12:00-13:30 | ☑ Lunch break (Council Room 063) |

| 13:30-14:30 | ☑ Keynote: What is Important for Innovation: Skills, Experiences and Environments, Debasish (Deba) Dutta, Purdue University (Queen Anne Court Howe Lecture Theatre 080) |
| | Chair:Les A. Piegl |

| 14:30-15:00 | ☑ Coffee break (Council Room 063) |

15:00-17:00	Queen Anne Court Howe Lecture Theatre 080	QAC Room 038	QAC Room 039
	☐ **Computer-aided design and engineering**	☐ **Product life cycle managment**	☐ **Machining**
	Chair:Yongsheng Ma	Chair:Qingjin Peng	Chair:Remus Tutunea-Fatan
	Mold Modification To Fix Warpage With Cooling Prediction For Plastic Products Junyu Fu; Yongsheng Ma	*Evaluation Of Open-architecture Product Adaptability Using Quantitative Measures* Chao Zhao; Qingjin Peng; Peihua Gu	*Cad-based Calibration For On-machine Measurement Using Vision* Lorène Dubreuil; Yann Quinsat; Claire Lartigue
	Estimation Of Cad Model Simplification Impact On Cfd Analysis Using Machine Learning Techniques Florence Danglade; Philippe Veron; Jean-Philippe Pernot; Lionel Fine	*The Role Of Statistics In Addressing The Level Of Maturity Of Smes In Terms Of Plm Collaboration* Sara MAHDIKHAH; Mourad MESSAADIA; David Baudry; Bélahcène Mazari; Anne Louis; Richard Evans; James GAO; Thierry Paquet	*5d Cubic B-spline Interpolated Compensation Of Geometry-based Errors In Five-axis Surface Machining* Md Shafayet Bhuiya; Remus Tutunea-Fatan
	Workflows For The Exchange Of Specialized Cax Data Lukas Weingartner; Alfred Sadlauer; Peter Hehenberger; Stefan Boschert	*Investigation Into Current Industrial Practices Relating To Product Lifecycle Management In A Multi-national Manufacturing Company* Ismael Essop; Richard Evans; Muni Giddaluru; Shan Wan; James Gao	*A Comparative Study Between Nurbs Surfaces And Voxels To Simulate The Wear Phenomenon In Micro-edm* Anthony Surleraux; Jean-Philippe Pernot; Samuel Bigot
	Defeaturing Sheet Metal Models Using Feature Information Yogesh Kulkarni; Ravi Kumar Gupta; Anil Sahasrabudhe; Mukund Kale; Alain Bernard	*Mapping Product Life-cycle Knowledge For Eco-improvement* Davide Russo; Marco Serafini; Caterina Rizzi	*Nc Simulation For Adaptive Look-ahead Interpolator With On-line Collision Detection* Hong-Tzong Yau; Chia-Hao Chang; Tsan-Jui Yang; Jiun-Ting Lin

| 18:00-19:00 | ☑ Conference banquet for group 1 (Council Room 063) |

| 19:00-20:00 | ☑ Conference banquet for group 2 and award reception (Council Room 063) |

Tuesday, 23 June 2015

| 8:45-9:00 | ☑ Announcements (Queen Anne Court Howe Lecture Theatre 080) |
| | Chair:Les A. Piegl |

| 9:00-10:00 | ☑ Keynote: Intelligent Machining for Complex Aerospace Structural Parts based on Dynamic Features, Yingguang Li, Nanjing University of Aeronautics and Astronautics, CHINA (Queen Anne Court Howe Lecture Theatre 080) |
| | Chair:James Gao |

| 10:00-10:30 | ☑ Coffee break (Council Room 063) |

10:30-12:00	Queen Anne Court Howe Lecture Theatre 080	QAC Room 038	QAC Room 039
	☐ **Biologically inspired design**	☐ **Robots and flexible manufacturing systems**	☐ **Human factors and perception 1**
	Chair:Khairan Rajab	Chair:Yonghua Chen	Chair:Than Lin
	Architecture For A Robust Cad Kernel Built On The Principles Of Energy Medicine-based Healing Khairan Rajab; Les Piegl; William Oropallo	*Simulation Of A Robot Machining System Based On Heterogeneous-resolution Representation* yonghua chen	*Ergonomics Product Development Of Over Bed Table For Bedridden Patients* Than Lin; Akhila Ekanayake; Lewis S. Gaweshan; Zareer A. Hasan
	Method For Evaluating Mechanical Characteristics Of Biological Material For Bio-inspired Lightweight Design Satsuki Tsunenari; Tetsuo Oya	*A Spline-based Flexible Method Of Virtual Force Design For Dynamic Motion Planning Of Robots* S.H. Choi; W.K. Zhu	*Investigation On Light Effect On Spatial Illusion Resulting From Forced Perspective* Nan-Ching Tai
	Embedding Biological Knowledge In A Conceptual Design Tool Niccolò Becattini; Gaetano Cascini; Francesco Rosa	*Zero-point Fixture System As A Reconfiguration Enabler In Flexible Manufacturing Systems.* Marcello Urgo; Walter Terkaj; Claudio Cenati; Franca Giannini; Marina Monti; Stefania Pellegrinelli	*The Effect Of Colored Lighting On Color-depth Perception – Comparing Two Techniques In Hdr Image Generation* Ruth Genevieve Ong; Nan-Ching Tai

| 12:00-13:30 | ☑ Lunch break (Council Room 063) |

13:30-15:00	Queen Anne Court Howe Lecture Theatre 080	QAC Room 038	QAC Room 039
	☐ **Knowledge engineering and design intent 1**	☐ **Reverse engineering 1**	☐ **Human factors and perception 2**
	Chair:Roberto Raffaeli	Chair:Hiroshi Masuda	Chair:Masakazu Kobayashi
	Translating Moka-based Knowledge Model Into Software Model Devaraja Holla Vaderahobli; Narayanan Chinthavalappu Chidambaran	*Reconstruction From A Single View Image Of An Engineering Model* Arjun Raj; Ramanathan Muthuganapathy	*System Based On Abstract Prototyping And Motion Capture To Support Car Interior Design.* Giandomenico Caruso; Serena Camere; Monica Bordegoni
	Explicit 3d Functional Dimensioning To Support Design Intent Representation And Robust Model Alteration Ferruccio Mandorli; Harald E. Otto; Roberto Raffaeli	*Interactive Collision Detection For Engineering Plants Based On Large-scale Point-clouds* Takeru Niwa; Hiroshi Masuda	*A Method For Supporting Aesthetic Design Based On The Analysis Of The Relationships Between Customer Kansei And Aesthetic Element* Masakazu Kobayashi; Takuma Kinumura; Masatake Higashi
	New Approach Of The Product-specific Knowledge Balance Based On Data Mining Of Virtual Prototypes Stefan Hinsen; Margot Ruschitzka; Peter Gust	*Improving Medial Surfaces For Reverse Engineering* Vaibhav Kumar; Takashi Michikawa; Hiromasa Suzuki	*On Development Of Methods For Expressing Customer Affective* Yu Zhao

| 15:00-15:30 | ☑ Coffee break (Council Room 063) |

15:30-17:00	Queen Anne Court Howe Lecture Theatre 080	QAC Room 038	QAC Room 039
	☐ **Knowledge engineering and design intent 2**	☐ **Reverse engineering 2**	☐ **Geometric modeling**
	Chair:Severin Stadler	Chair:David Capson	Chair:Martin Held
	Multi-cad Approach In Knowledge-based Design Markus Salchner; Severin Stadler; Mario Hirz; Johannes Mayr; Jonathan Ameye	*Curvature-based Coarse Registration For Dimensional Metrology* Rindra Rantoson; Charyar Mehdi-souzani; Nabil Anwer; Hichem Nouira	*Automatic Quad Patch Layout Extraction For Quadrilateral Meshes* Sen Zhang; Hui Zhang; Jun-hai Yong
	A Knowledge-based Framework For Integration Of Computer Aided Styling And Computer Aided Engineering Severin Stadler; Mario Hirz	*Practical Procedure Of A Sport Ship Surface Interpolation And Its Application* Jana Gavačová; Matúš Grznár; Ján Žiška; Peter Belej	*A New Approach For Irregular Porous Structure Modeling Based On Centroidal Voronoi Tessellation And B-spline* Yaohui You; Shuting Kou; S. T. Tan
	Optimized Development: Defining Design Rules Through Product Optimization Techniques Marco Serafini; Francesco Furini; Giorgio Colombo; Caterina Rizzi	*Dot Grid Detection And Tracking For Sheet Metal Strain Analysis* Tyler Kenyon; Allan Spence; David Capson	*Variable Offsetting Of Polygonal Structures Using Skeletons* Martin Held; Stefan Huber; Peter Palfrader

| 18:00-20:00 | ☑ CAD&A Editorial Board meeting (Off Campus) |

Wednesday, 24 June 2015

8:45-9:00	**Announcements** (Queen Anne Court Howe Lecture Theatre 080) Chair:Les A. Piegl
9:00-10:00	**Keynote: Intellectual Property and Knowledge Management to Support Product Innovation, Caterina Rizzi, University of Bergamo** (Queen Anne Court Howe Lecture Theatre 080) Chair:James Gao
10:00-10:30	**Coffee break** (Council Room 063)
10:30-13:30	**Workshop: Manufacturing SME's role in collaborative innovation** Chair:Caterina Rizzi

10:30-12:00	Queen Anne Court Howe Lecture Theatre 080	QAC Room 038	QAC Room 039
	Advanced design systems Chair:Jean-Philippe Pernot *A Theoretical Framework For Supporting A Novel Design Development Process: An Interactive Semantic-based Approach In Computer Assisted Parametric Design* Mihai Dupac *Simulation-oriented Transformation Of Cad Models* René Andrae; Peter Köhler *Towards Declarative Cad Modeler Built On Top Of A Cad Modeler* Dorian Decriteau; Jean-Philippe Pernot; Marc Daniel	**Bio-engineering 1** Chair:John Johnstone *A 360-degree Holographic Display System For Radiotherapy Treatment Planning* Yuk Ying Lu; Shara Wee Yee Lee; Khaw Kim; Ruxu Du *Estimation Of Clavicle Plate Bending Angles Before Surgery* Yuk Ming Tang; Tai Lok Cheung *Measuring Mean Cup Depth In The Optic Nerve Head* John Johnstone; Lindsay Rhodes; Massimo Fazio; Brandon Smith; Lan Wang; Crawford Downs; Cynthia Owsley; Christopher Girkin	**Process planning** Chair:Yonghua Chen *Topology Optimization For Manufacturability Based On Visibility Map* jianan lu; yonghua chen *An Energy Saving Approach For Rough Milling Tool Path Planning* Ke Xu; Kai Tang *Multi-user Collaborative Tool Path Planning* Andrew Priddis; W. Edward Red

12:00-13:30	**Lunch break** (Council Room 063)

13:30-15:00	Queen Anne Court Howe Lecture Theatre 080	QAC Room 038	QAC Room 039
	Knowledge engineering and design intent 3 Chair:Thivakar Manoharan *Cax Systems Knowledge Integration* Thivakar Manoharan; Marcin Humpa; Alexander Martha; Peter Koehler *Simulation Data Management For Design Of Experiments: Concepts And Specifications* Gaëtan BLONDET; Farouk BELKADI; Julien LE DUIGOU; Alain BERNARD; Nassim BOUDAOUD *Features That Impact Knowledge Sharing In Community Of Practices Among Design Engineers* light zaglago	**Bio-engineering 2** Chair:Alberto Paoluzzi *Cad Models From Medical Images Using The Linear Algebraic Representation* Antonio DiCarlo; Miroslav Jiřík; Alberto Paoluzzi *Mixed Reality To Design Lower Limb Prosthesis.* Andrea Vitali; Giorgio Colombo; Giancarlo Facoetti; Caterina Rizzi *Patients' Evaluation Based On Digital Motion Acquisition* Daniele Regazzoni; Caterina Rizzi	**Design support 1** Chair:Moritz Cohrs *A Cad Tool To Support Idea Generation In The Product Planning Phase* Daniele Bacciotti; Yuri Borgianni; Federico Rotini *Time-efficient And Accurate Spatial Localization Of Automotive Function Architectures With Function-oriented 3d Visualization* Moritz Cohrs; Valeri Kremer; Stefan Klimke; Gabriel Zachmann *Design Criteria Modeling – Use Of Ontology-based Algorithmic Modeling To Represent Architectural Design Criteria At The Conceptual Design Stage* Chieh-Jen Lin

15:00-15:30	**Coffee break** (Council Room 063)

15:30-17:00	Queen Anne Court Howe Lecture Theatre 080	QAC Room 038	QAC Room 039
	Tolerances Chair:David Capson *Multi-sensor Blue Led And Touch Probe Inspection System* Kai Xue; Venu Kurella; Allan Spence *Quality Appearance Evaluation Of Automotive Bodies: Effect Of Flexible Parts Tolerances On Final Product's Surface Quality* Ali Hashemian; Behnam Moetakef Imani *Automatic Post-processing For Tolerance Inspection Of Digitized Parts Made By Injection Molding* Michele Bici; Francesca Campana; Alessio Trifirò	**Feature recognition** Chair:Paolo Cicconi *Shape Terra: Industrial Feature Recognition Based On Persistent Heat Signature* Ramy Harik; Seung-Yeob Baek; Barend-Jan Van Bruchem; Michel Van Tooren *Recognition Of Depression And Protrusion Features On B-rep Models Based On Virtual Loops* Jiing-Yih Lai; Ming-Hsuan Wang; Yu-Kai Chiu; Chia-Hsiang Hsu; Yao-Chen Tsai; Chung-Yi Huang *Automation Of Drafting Execution By Schemes Definitions And Feature Recognition* Roberto Raffaeli; Paolo Cicconi; Michele Germani	**Design support 2** Chair:Rahul Renu *Retrieval Of Solid Models Based On Assembly Similarity* Rahul Renu; Gregory Mocko *An Investigation On Sustainable Design Index And Its Implementation Within The Cad Environment* Norhisham Seyajah; Kai Cheng; Richard Batmen *Watermarking Scheme For Geometric Data Protection And Detection On 3d Cad Assembly Model* K. M. Yu; K. M. Au; W. K. Chiu

18:00-19:00	**Gala dinner and musical performance for group 1** (Council Room 063)
19:00-20:00	**Gala dinner and musical performance for group 2** (Council Room 063)

Thursday, 25 June 2015

8:45-9:00	**Announcements** (Queen Anne Court Howe Lecture Theatre 080) Chair:Les A. Piegl
9:00-10:00	**Keynote: PLM-based Solutions for Extended Enterprises, David Baudry, LUSINE Research Lab, CESI, FRANCE** (Queen Anne Court Howe Lecture Theatre 080) Chair:James Gao
10:00-10:30	**Coffee break** (Council Room 063)

10:30-12:00	Queen Anne Court Howe Lecture Theatre 080	QAC Room 038	QAC Room 039
	Curves and surfaces Chair:Abdulwahed M. Abbas *On The Interpolation Of Non-iso-parametric Curves* Abdulwahed M. Abbas *Reformulation Of Generalized Log-aesthetic Curves With Bernoulli Equations* Kenjiro T. Miura; Gobithaasan R.U.; Sho Suzuki; Shin Usuki *Generating A Reference Model Of The Surface With A Hole For Downstream Process* Gulibaha Silayi; Tsutomu Kinoshita; Katsutsugu Matsuyama; Kouichi Konno	**Collaborative systems** Chair:Monica Bordegoni *Hierarchical Role-based Access Control For Multi-user Collaborative Cax Environment* Chia-Chi Teng; Francis Mensah; J Ekstrom; Richard Helps; Greg Jensen *Towards An Integrated Framework To Support Contract Furniture Industry* Maura Mengoni; Monica Bordegoni; Massimo Mecella; Margherita Peruzzini *Detecting Local Undo Conflicts In Multi-user Cad* David French; Scot Wilcox; Kevin Tew; Edward Red	**Advanced design applications 1** Chair:Kang Park *Associative Cae Feature Concept For Fluid Control Effect Modeling In Cyclic Design Interactions* Lei Li; Yongsheng Ma *On Conceptual Modeling Of Apparels* Yu Zhao; W.J. Zhang *External Ballistics For An Anti-aircraft Gun With Flow Simulations Around A Bullet* Minsuk Choi; Kang Park

12:00-13:30	**Lunch break** (Council Room 063)

13:30-15:30	Queen Anne Court Howe Lecture Theatre 080	QAC Room 038	QAC Room 039
	Surfaces and CAD research Chair:Fuhua Cheng *A G2 Interpolation Scheme For Polar Surface* Jianzhong Wang; Fuhua Cheng *Retaining Circular Features On Deforming Subdivision Surface* Yiu Wai Tsoi; Kin Chuen Hui *50 Years After "sketchpad", Has Cad Research Reached A Golden Age?* Oladele Owodunni	**Prototyping** Chair:Lujie Chen *Exploration Of A Design Framework For Large-scale Model Manufacturing* Lawrence Sass; Lujie Chen; Woong Ki Sung *Development Of The Prototype Of A Mechanical Arm With A Semicircular Path Via The Isometric Transformations Of A Tetrahedron* Dina Rochman; Enrique García *Moving Sequence Generation Based On Hungarian Method For Pick-and-place Processes* Wei Pan; Lujie Chen *Rapid Prototyping And Thermal Gradient Method Applied To Fabrication Porous Structure For Application In Biomedical Field* Shreepad Sarange; Ravi Warkhedkar	**Advanced design applications 2** Chair:Shinji Yoshida *Optimization Of Nozzle Head Toolpath And Component Shape Library In Printed Electronics* Neeraj Panhalkar; Sam Anand *Shotline Analysis Of Ground Combat Vehicles Using Target Geometry Modelling* Chul Yoo; Kang Park; Minsuk Choi *Piping Design For Production Facilities Using 3d-cad* Shinji Yoshida

15:30-16:00	**Coffee break** (Council Room 063)
16:00-16:30	**Closing remarks and introducing CAD'16** (Queen Anne Court Howe Lecture Theatre 080) Chair:Les A. Piegl