

INDUSTRY SHOWCASE

OF FINAL YEAR COMPUTING PROJECTS



COMPUTING LABORATORY, HAUGHTON BUILDING, IT CARLOW



WELCOME

It is with great pleasure that I welcome you to this exhibition of projects from our final year Computing (Honours) Degree students. I hope you enjoy the exhibition and if you have any feedback we would welcome the opportunity to hear from you.

Nigel Whyte
Head of Department

THE COMPUTING DEPARTMENT

The Computing Department has been a central and productive component at the Institute of Technology Carlow for well over a quarter of a century. During this time the department has developed and enhanced its reputation for producing industry-ready graduates for leading national and international companies as reflected by the breadth and tenor of the projects (and associated technologies) shown in this brochure.

Work placements are offered as part of all undergraduate ordinary and honours degree programmes (all of which are applied in nature) including Software Development, Information Technology Management, Computer Games Development and Cybercrime & IT Security.

The department has in excess of 30 highly qualified academic staff, committed to the ongoing progression and development of the department for the betterment of the 500+ students currently enrolled. Students enjoy state-of-the-art computing and laboratory facilities with a recent investment of €350,000 on virtualisation technology, typifying this commitment to supporting and enriching the students' undergraduate programme experience.

The new Houghton Building, a €10 million investment opened in January 2017, is an ultra-modern teaching and learning space built to facilitate the growing number of students wishing to study at the Institute. The Computing Games Development laboratories are housed in the Houghton Building, ensuring the most up to date equipment and learning environment for students.

The department maintains an international perspective technologically, socially and culturally by collaborating widely with other computing departments and higher education providers with active undergraduate and postgraduate research links with the Netherlands, France, China, Germany, Finland, Norway, Hungary and the UK.

The department has strong collaborative relationships with key local, national and international ICT organizations ensuring that students acquire up-to-date skills. For example, the local software development wing of UNUM, the international insurance company, sponsor the Software Development Centre at the Institute.

Graduates of IT Carlow are sought after by leading organizations and our alumni are working for global leaders including:

UNUM	IBM	Microsoft
SAP	Amazon	Apple
Intel	VMWare	Symantec
HP	Kerry Group	Glanbia
Bord na Mona	AOL	SAGE
Fineos	Havok	Demonware
PlayFirst	Aeria Games	Sony Entertainment
Netwatch	Google	Crossell
Eureka	DataPac	Pfizer
Blacknight	NeoData	GameSparks



PROGRAMMES IN COMPUTING

IT Carlow offer a range of programmes from Certificate level right through to Masters incorporating the full range of skills including Programming, Project Management, Systems Administration, Software Engineering and many more.

UNDERGRADUATE

- BSc (Honours) Computer Games Development
- BSc (Honours) Software Development
- BSc (Honours) in Cyber Crime and IT Security
- BSc (Honours) Information Technology Management
- BSc Information Technology Management
- BSc Software Development
- BSc Cybercrime and IT Security
- Higher Certificate in Science Computing
(with options in Computer Applications,
Commercial Programming)

POSTGRADUATE

- MSc Data Science
- MSc Information Technology Management
- Higher Diploma in Science in Computing – Systems and Information Technology Services
- Higher Diploma in Science in Computing – Software Development for Games and Apps



PROJECTS ON DISPLAY

GAMES DEVELOPMENT



PROJECT TITLE	TECHNOLOGIES	STUDENT
Realtime Browser based raytracer with CSG	SQL, JavaScript, WebGL, C++ and OpenGL	Sean Byrne
Investigation into the effectiveness of two gamification techniques directed at improving learning and motivation for third level education	JavaScript and PhoneGap	Shane Callanan
Procedural dungeon generation	SFML and C++	Christian Carpio
Procedural Generation of Terrain	SFML and C++	Evan Cunningham
Deep dive into the research and implementation of ai flocking algorithms	SFML and C++	Josh Cunningham
RTS with Advanced AI Pathfinding	SFML and C++	Benjamin Delaney-Brownlow
Compare and Contrasting 2D Node Based AI Pathfinding Algorithms	SDL2 and C++	Stephen Donegan
Githug (code wars style game based on git)	SDL2 and C++	George Dixon
RTS 2D Game Exploring the capabilities of AI to learn player strategies and use this to build their own response	SFML, Box2D and Rapidjson	Stephen Ennis
Comparing efficiency and effectiveness of dynamic algorithms	SFML and C++	Liam Howe
Super Squid Squirrels - The Squashening	SFML and C++	Jamie Jackson
Voxel Game Editor	SDL2, OpenGL and C++	Craig Johnston
Efficient Mobile Virtual Reality Framework	OpenGL and C++	Aaron Keating
To investigate the application of GOAP and MCTS to assess how effective the AI is in challenging an opponent	SFML and C++	Francis Lyons
An investigation/comparison of AI behaviour trees for GPU execution	CUDA	Robert McDonagh
Investigation into Genetic Neuroevolution, specifically NEAT, as a means of progressively increasing AI difficulty in games.	SFML and C++	Niall Milsom
Entity component based pattern architecture to facilitate the creation of a Multiplayer game.	SDL2, Box2D and C++	Shauna Moffatt
Procedural Generation of Music using Music Theory and Cellular Automata	PDCurses and C++	Alex Mounsey
NFC collectible game and model viewer	JavaScript, A-Frame, NFC	Gavin O'Brien
Bomb Build	SDL2 and C++	Odon Flanagan
Voronoi polygons as a mechanism for pathfinding	SDL2, C++ and SDL2_gfx	Anthony O'Sullivan
Improving user experience in multiplayer online games	SDL2, EC2 : Linux Server, C++	Jason Power
2D Level Editor	SFML, Box2D and C++	Tomas Scott
Level Editor with Physics	SDL2, OpenGL and C++	Linh Tan Huynh
Top down 2D game/demonstration on Combining genetic algorithms with neural networks resulting in evolution over generations.	Unity and C#	Libor Zachoval

SOFTWARE DEVELOPMENT



PROJECT TITLE	TECHNOLOGIES	STUDENT
PythonGUI	Python, Tkinter, PTPython, Pronmpt-Toolkit	Inga Melkerte
PTAssist	Ionic, NodeJS, ExpressJS, PassportJS, AngularJS	Derek Reilly
RunForIT	Ionic, Gulp, AngularJS, Node.js, Google API, Facebook API, Google TTS, Firebase	Bartosz Zurawski
ExamIT	OpenCV, Python, Flask, Mongo, Javascript, Jinjar	Roger Marciniak
AniMap	Python, Flask, HTML, CSS, Javascript, JQuery, MySQL, PhoneGap, Bootstrap	Gearoid Lacey
Opinion Miner	Python, AngularJS, Ionic, Karma, Protractor, JQuery, Mongo, SASS	John Kelly
BRACE	Python, Flask, HTML, CSS, Javascript, JQuery, MySQL, PhoneGap, Bootstrap	Declan Fennell
Looprac	Python, Flask, PhoneGap, HTML, CSS, Javascript, JQuery, MySQL, Bootstrap	Kevin Dawson
ClickNWin	Python, Flask, Javascript, PythonAnywhere	Geoff Atkinson
Distributed Data Mining and Machine Learning	Scala, HDFS, Apache Spark, Akka, Aerospike, Docker, Deeplearning4J, CentOS7	Liam Maloney
WatchGame	Java, Android, XML, SQL	Peter Elliott
PyGen	Python, AST, ECLIPSE Constraint Programming System	David Bryan
The Ardu Project	Python, Flask, MySQL, Javascript, HTML, CSS	Aaron Tse
Maap (Messaging as a Platform)	Java, Android, MongoDB, node.js, Firebase Cloud Messaging	Ahmed Chihabeddene

DATA SCIENCE

PROJECT TITLE	STUDENT
Utilistion of London Fire Brigade Data to Predict Fire Incidents	Patricia Cusack
Irish Traditional Music MarkUp Data Analysis	Aidan Doyle
Comparative survey of big data tools and technologies for Real-time data analysis	Isoken Ekonorue
Social Media Data & Sentiment Analysis to Assist Disaster Response	Thomas Fitzsimons
Using a Neural Network to Predict Live Register Figures for the Next Five Years	Claire Murphy
Evaluating the impact of housing economics on Dublin crime offences	Michael Murphy
World Wide Terrorism Data	Nadeem Muhammad
WHO Data Disease Prevalance Rate Assessment	Kenneth Sythes
Snooping/Hacking BTS Data	Chris Young



PROJECTS ON DISPLAY (CONTINUED)

IT MANAGEMENT

PROJECT TITLE	TECHNOLOGIES	STUDENT
DickyBirds GPS Dog Collars	NFC, GPS	Peter Coughlan Paul Rizos
Smart Inhaler Prototype (AerPal)	Raspberry Pi, Python, Bluetooth, Firebase Console, Android API Developer	Richard Phelan Noel Howell Daniel Quirke
Go-2-Ice	GPS, RFID, BLUETOOTH	Mark White David O'Connor Noel Lawlor
Secure Card Payment Method	Biometric(Ultrasonic), EMV	Jamie Ryan Brian Mullally
Automation of Vertical Farming	Robotics, IOT, Ordering system	Martin Murphy Dylan Furlong Patrick Brickley
GlucoScan	Mobile NFC, FreeStyle Libre sensor, Continuous Glucose Monitoring (CGM), MongoDB, JSON, Mlab, IFTTT, Azure	Conor Hall Soraia Ferreira James Kelly
Second Time Around School Books	Wordpress, PHP, MySQL	Paul Dowling Bayli Carr David Young
Study Buddy	TTS, Translation, OCR	Wole Etimiri Minzhen Wu Abdul Alshammari
Concussion Scout	NFC, Cloud Storage, Accelerometer, Website	Conor Doyle Audrius Kundrotas
Countmein	Geo-Coding, Geo-Location, Pay Systems, HTML, STMP	Ciara McMahon Brian Breslin Paul Byrne

PROJECTS MAKING THE HEADLINES



INSTITUTE OF TECHNOLOGY CARLOW WINS BIG AT GAMES FLEADH

Computer Games Development students created a smart robot which defeated the other competing colleges and universities during thirty robotic MMA style battles. The Institute's students also demonstrated computer game titles which won Visual Effects and Artificial Intelligence Engineering Awards. One team in particular created intellect bots to repair gameplay, helping a human player defeat all other human competitors. Dr. Oisín Cawley, who lectures in Artificial Intelligence at IT Carlow, set students the challenge of creating intelligence bots which would play through games without any human intervention.

The seven awards won by the students are: Robocode Marshal Champions; Best in Visual Engineering; Best in Artificial Intelligence; Best in Gameplay; Best in Use of Cloud Technology; Best in Multiplayer; Games Studio Ireland Challenge (runners-up)

Commenting on this year's success, Dr. Cawley said, "Building intelligent systems in computer challenging environments such as games will yield discoveries which can also be applied in non-gaming domains, such as financial services, automotive, healthcare and utility industries. The concepts students learn, such as behaviour trees, fuzzy logic, or Artificial Neural Networks are universally applicable".

Welcoming back the award winning teams, Nigel Whyte, head of the Computing Department at Institute of Technology Carlow "The artificial intelligence era of computing is here and IT Carlow students are developing the skills to build smart systems that will improve our lives and environment as the world is wrapped in a fabric of sensors that will be monitored and controlled by the Artificial Intelligence our students created".

PROJECTS MAKING THE HEADLINES (CONTINUED)



IT CARLOW STUDENT CREATES WINNING IDEA FOR THE ANNUAL TATA 'DRAGON'S DEN' COMPETITION

L-R: Christine Carty, HR Business Partner TATA Consultancy Services (TCS); Jonathan Dempsey, Director of Education TATA Consultancy Services (TCS); Steve Curry, IT Management Student and TATA Challenge 2016 winner; Dr Enda Dunican, Programme Director & Project Supervisor, Computing Department, IT Carlow

Leading global Information Technology consultancy, Tata Consultancy Services (TCS), teamed up again this year the Computing and Networking Department of Institute of Technology Carlow (IT Carlow) with its TCS Challenge, a 'Dragon's Den' style competition where students' final year projects compete for a €1,500 cash prize (funded by TCS). The aim is to produce a business plan for a commercially sound, innovative Information Technology service or product, which addresses an ethical concern in today's society.

Jonathan Dempsey (Director of Education - TCS) and Christine Carty (HRM - TCS) formed the judging panel at the Institute of Technology Carlow.

A number of groups with the most suitable project submissions underwent a gruelling Q&A session. The winning project entitled "Smart review" was a web and app-based solution that allows parents to rate the safety of computer games for children. The winning project was undertaken by Steve Curry. Steve received a cash prize of €1,500 to assist him in bringing his idea to the market. During their presentations the shortlisted entrants were given invaluable feedback from the judging panel.

IT CARLOW TEAM 'MY PEOPLE CARE' CLOUD SERVICE WINS €40,000 IN SEVILLE



The 'My People Care' software project whose members come from IT Carlow, finished 2nd in the FIWARE 'Smart Society' competition in Seville, Spain, recently. An investment prize of €40,000 was awarded to Dominik Chomic, Robbie Lynch, both recent graduates

of the Honours Degree in Software Development. The team are pictured here alongside Course Director, Chris Meudec.

The 'My People Care' project in development is a service that allows its users to securely store their own private medical information using their smartphone and share it, if they wish, with any number of carers. Its aim is to ease and facilitate the work of carers by synchronising a patient's own records. The IT Carlow team was one of 20 teams out of 300 to be selected last June for the finals in Seville.

Dr Enda Dunican, IT Carlow said "As programme director of the BSc (Hons) in IT Management, I am delighted to see that TCS consider the work we are doing here as worthy of ongoing sponsorship. It enables our students to get feedback on their projects from one of the leading IT consultancy companies in the world. I wish to thank my colleagues in the Computing Department, Dr Greg Doyle, Mr Gerry Moloney, Dr Keara Barrett and Mr Richard Butler for all of their hard work in supervising these projects and getting them to this stage. I would also like to thank our Head of Department Mr Nigel Whyte for his continued support of the initiative. We very much look forward to ongoing collaboration with TCS which is going from strength to strength each year".

TCS was delighted to set the challenge for the students of the IT Management degree program this 2015/2016 academic year and looks forward to forging stronger ties with Institute of Technology Carlow in the future.

GAMECORE NEWS UPDATE

The gameCORE research centre conducts both pure and applied research with a focus on the areas of Games and Technology Enhanced Learning (including Games Based Learning and Gamification). gameCORE also has research interests in Ambient Assisted Living (AAL), Internet of Things (IoT), Data Analytics, AI, and Cybersecurity.

gameCORE has strong links with industry, and has been involved with numerous collaborations, largely funded by Enterprise Ireland and the Irish Research Council. gameCORE has also been successful in a number of EU funding applications - such as the current Erasmus+ project (€300k) on Serious Games and Welfare Technology and the Join-in project (€3m) on games for addressing cognitive decline and social isolation in elderly people. Some current collaborative projects with industry partners include:

- VERI: Mobile Usability in Integrated Training-Intuition: Gaming in Corporate Learning Environments

- The SMARTS: gamifying an arts based programme to help young children and their parents
- Tumbledown Media: Freddy Buttons, a game teaching children the origins of different foods
- Galvanic: A gamified app using the PiP platform for helping people to learn how to manage stress
- gameCORE is a member of Design+, which combines the core strengths of IT Carlow in the fields of Design, ICT, Engineering and Bioscience to address and solve close-to-market commercial needs. Support services offered by Design+ include accessing R&D solutions, developing new products or services and optimising processes. There are many sources of funding, such as Enterprise Ireland's Innovation Voucher and Innovation Partnership Programme. Some previous collaborative projects with industry partners include:-Doctoral Net: A game to teach PhD students about bias-Classroom Guidance: A learner record system for Guidance and 21st Century skills -Mooskhu: Games for change for children. If you are interested in exploring a potential project with us, we would be delighted to speak to you on the day and advise on the various funding sources. You can also contact us at gamecore@itcarlow.ie.

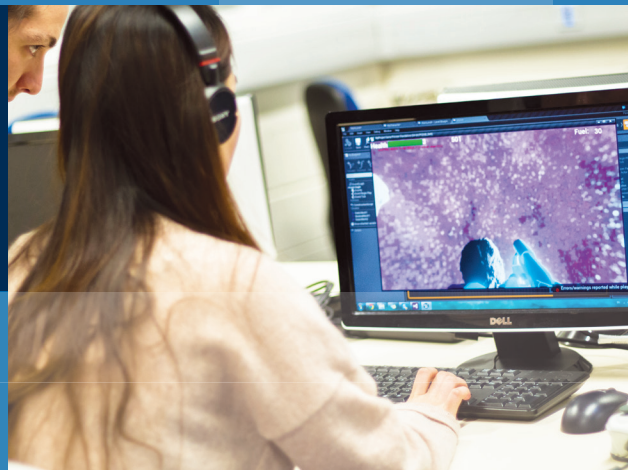


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