

## Postgraduate study

MSc in Computing

MSc in Cognitive Computing

MSc in Computer Games and Entertainment

MA in Computational Arts

MFA in Computational Studio Arts

MPhil and PhD in Computing

MPhil and PhD in Arts and Computational Technology

# Computing



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This booklet gives information about the postgraduate programmes in the Department of Computing, Goldsmiths, University of London. Please read it in conjunction with our Postgraduate Prospectus.

We can supply information in alternative formats for people with a visual impairment. Please contact External Communications, tel **+44 (0)20 7919 7971** e-mail **ext-comms@gold.ac.uk**.

# Introducing the Department

The Department of Computing at Goldsmiths is a vibrant, innovative environment combining contemporary computing research with cutting-edge, applied, creative approaches. We produce groundbreaking interdisciplinary work in creative technologies that spans the arts, music, media, design, games, psychology and performance.

We have attracted over £8 million in research funding in recent years and we are one of the leading departments in Europe for computing in music and the arts. Our staff are drawn from a wide range of professional and educational backgrounds, supporting a diverse and rewarding educational experience. Through our strong profile in computer science and artificial intelligence, we continue to develop cutting-edge, technology-based interdisciplinary research in music, the arts, film, TV, games and social networking, collaborating with similar institutions of international expertise including the Tate, MIT, Cambridge University, BT, the BBC and many others.

## Why choose Computing at Goldsmiths?

- At Goldsmiths, we believe that computing is inventive, artistic, dynamic and importantly, fun. Our teaching aims to develop the creative as well as the technical skills of you as a student. This is what makes our approach so distinctive;
- We have an expert team of friendly, supportive staff who are actively involved in how computing can be used creatively in IT, film, music, design as well as in social and environmental issues. A postgraduate degree in Computing from Goldsmiths prepares you for a career at the very head of the game;
- We are renowned for our groundbreaking research. In the 2008 Research Assessment Exercise, 20% of the computing research submitted was judged to be world-leading, putting us in the top 25 institutions in the UK. A further 40% was classified as research of international excellence. As a student in the Department, you will be very much part of this dynamic and vibrant research culture;
- You are taught in state-of-the-art laboratories in our two internationally renowned research centres. The Centre for Cognition, Computation and Culture investigates creative uses of IT, new media and computational modelling of cognitive and cultural processes. In addition, our new Centre for Creative and Social Technology fosters interdisciplinary exploration of the ways in which computing, digital culture and creative engagement are becoming highly social activities, embracing the growing link between digital technologies and artistic practice.

For more information on the Department, visit [www.goldsmiths.ac.uk/computing](http://www.goldsmiths.ac.uk/computing).

## Skills for your future career

Studying Computing at Goldsmiths will give you all the skills you need to become a professional in the field. You will learn how to turn a proposal into a working system that can develop and grow to meet new and changing needs.

These skills will include knowledge of:

- Computer programming and programming paradigms at an advanced level;
- Interdisciplinary computing: approaches to computing from and applications to a wide range of disciplines including arts practice, media, psychology and philosophy;
- Theoretical foundations to practical work in computing. These range from the mathematics underpinning graphics to a theoretical analysis of computational art works and philosophical and cognitive approaches to artificial intelligence;
- Specialist computing topics ranging from computer graphics and artificial intelligence to mobile platforms and novel interaction techniques.

## Careers

Our programmes focus on contemporary creative and interdisciplinary contexts, giving you skills that can lead to jobs across the creative sector in film, TV, sound, online media, music and games, with many of our students entering employment in these areas. Of course you can create your own, working in collaboration with others to set up new kinds of practices and commissions.

Practical skills in artificial intelligence and programming, together with a deep understanding of intelligent systems, will open doors to high-grade employment opportunities in the computer games and entertainment industry; animation and graphic arts; aerospace; defence; research in cognitive science and intelligent software systems.

In addition, a postgraduate qualification can lead to continuing research in computational arts and/or computer science – up to half the students graduating from our Master's in Fine Art in Computational Studio Arts have continued to fully funded research upon completion of their studies.

Finally, students with a postgraduate qualification in computing benefit from having software engineering skills that are crucial to many industries, including on-line services, the financial sector, and design and manufacturing, providing you with a broad set of career options following the completion of your studies.

## Teaching

Our staff are drawn from a wide range of professional and educational backgrounds, which supports a diverse and rewarding educational experience, and creates a broad research profile. Further information on our staff is available on page 18.

## Assessment for 1 year Masters Programmes

Our Masters courses consist of two terms of taught courses followed by an extensive research project or dissertation. Each term, you will follow four separate courses, each of which is assessed by project work or extended essays. If you pass all eight courses, you will be allowed to progress to the final project or dissertation which runs from April to September. This is an extensive piece of original research work, which may take many forms depending on the

degree programme you are taking. It may be a piece of practical computing research (MSc Computing, MSc Cognitive Computing, MSc Computer Games and Entertainment), a research dissertation (MSc Cognitive Computing) or a substantial piece of research-led arts practice (MA Computational Art). Practical projects will be accompanied by a written project report. On successful completion of the practice project, students on the MA Computational Arts may choose to enter the second year of the MFA which consists of extensive and in depth studio practice. Students who pass eight taught courses, but who do not choose to progress to the final project, may graduate with a Postgraduate Diploma (PGDip); those that pass four courses may graduate with a Postgraduate Certificate (PGCert).

## Facilities

The Department has excellent computing facilities for teaching and laboratory work. There are four department laboratories containing 90 PCs equipped with a substantial amount of local software and with connections to the College and Department servers.

In addition, the Rutherford Building provides more than 200 PCs and Macintosh systems for general use in the College. All computers in the College are connected to central servers, which provide data storage, access to shared resources, such as the library catalogue, course and training materials and access to the internet. All students have access to e-mail facilities and can publish their own web pages.

## Ben Pimlott Building

As a computing student, you will also have access to our flagship Ben Pimlott Building, housing the Centre for Cognition, Computation and Culture. The Centre investigates creative uses of IT and new media, and computational modelling of cognitive and cultural processes, and promotes interdisciplinary research projects in collaboration with the Departments of Design, Music, Art, Psychology and Sociology. The Centre also contains a cutting-edge computer laboratory.

### **Centre for Creative and Social Technologies (CAST)**

The Centre for Creative and Social Technology (CAST) is jointly located in two state-of-the-art research spaces across Goldsmiths. The centre investigates computational approaches to arts and media practice, with a specific focus on the impact of technology on Social Science and Cultural Studies, bringing several disciplines and departments together to stimulate research and to provide integrated postgraduate teaching.

### **Goldsmiths Digital Studios**

Operating as part of CAST, Goldsmiths Digital Studios (GDS) is dedicated to multi-disciplinary research and practice across art and design technologies and cultural studies. GDS engages in a number of research projects and provides its own postgraduate teaching through the PhD in Arts and Computational Technology, the MFA in Computational Studio Arts and the MA in Computational Art.

We also run a regular evening event, the Thursday Club; an open forum discussion group for anyone interested in the theories and practices of interdisciplinarity, interactivity, technologies and philosophies of the state-of-the-art in today's (and tomorrow's) cultural landscape. It is supported by Goldsmiths Graduate School. Along with other departments within Goldsmiths, we operate through a network of key institutional alliances and relationships with individuals. In addition, we work with several artists and independent researchers.

Visit the Goldsmiths Digital Studios' web pages at [www.goldsmiths.ac.uk/gds](http://www.goldsmiths.ac.uk/gds) for more information.

### **GDS Audio Visual Interaction Laboratory**

Housed within the Goldsmiths Digital Studios, the Audio Visual Interaction Laboratory is a state-of-the-art facility for audiovisual interaction, motion capture, computer graphics, digital audio, perception and cognition research. The lab has an acoustically treated projection and motion capture space for real-time, accurate full body interaction, a 3D ambisonic surround-sound audio system, a range of audiovisual equipment including projection facilities, high quality microphones, and a fully soundproofed booth on a floating floor complete with Pro Tools and Genelec 5.1 Monitoring. The lab also features recently developed facilities for Brain-Computer Interface research through Electroencephalography (EEG).

# General Information

## Application and Admission

Application forms are available from, and should be returned to, the Admissions Office; you can also download copies at [www.goldsmiths.ac.uk/apply/pg](http://www.goldsmiths.ac.uk/apply/pg) where there is also more detailed information on making an application. Full contact details are given on page 20.

We recommend that you apply early in the academic year, especially if you intend to apply for funding. Admission is normally by interview except for those students residing outside the UK.

## Entrance requirements

Please refer to the individual programme entries.

## English language requirement

If English is not your first language, you need to obtain evidence of your English Language competence. Tests considered appropriate include (unless otherwise stated):

- International English Language Testing System (IELTS) – pass with at least 6.5 overall and a minimum of 6.0 in the written element (a 7.0 overall and a minimum of 7.0 in the written element applies for the MSc in Cognitive Computing);
- TOEFL score of at least 580 including 4.5 in the Test of Written English (TWE), or 237 in the Computerised Test (CT) including 4.5 in the essay component, or 92 in the Internet-based test (IBT) with a minimum of 23 in the written element;
- International GCSE (IGCSE) English as a second language at Grade C or above;
- Cambridge Certificate of Proficiency of English (CPE) Level 5 at Grade C or above;
- Cambridge Certificate in Advanced English (CAE) Level 4 at Grade B or above;
- Pearson Test of English (Academic), with a score of 68 overall, including 68 in the written element and 59 in all other elements.

For further information, please see the Postgraduate Prospectus or visit [www.goldsmiths.ac.uk/international/entry-requirements.php](http://www.goldsmiths.ac.uk/international/entry-requirements.php). International candidates may be accepted without an interview.

## Funding

The Department of Computing has a limited number of bursaries available for postgraduate study, and more information regarding these will be made available upon your application if applicable.

The EPSRC administers postgraduate awards through its training grants scheme. Full information can be found on the EPSRC website : <http://www.epsrc.ac.uk/funding/students/Pages/default.aspx>The AHRC administers postgraduate awards under a block grants scheme awarded to Goldsmiths, which provides funding for Masters preparation and doctoral research in the arts and humanities. Full information can be found on the AHRC website: <http://www.ahrc.ac.uk/apply/postgraduate.asp>.

There is further information on funding opportunities for students via Goldsmiths' Graduate School. Please refer to our website at <http://www.goldsmiths.ac.uk/costs/pg>. The link provides details on all the bursaries and scholarships available for Home, EU and International students, (for your information Goldsmiths has introduced three new scholarship schemes for postgraduate international students). If you require further information on any of the bursary schemes please contact: [s.begum@gold.ac.uk](mailto:s.begum@gold.ac.uk).

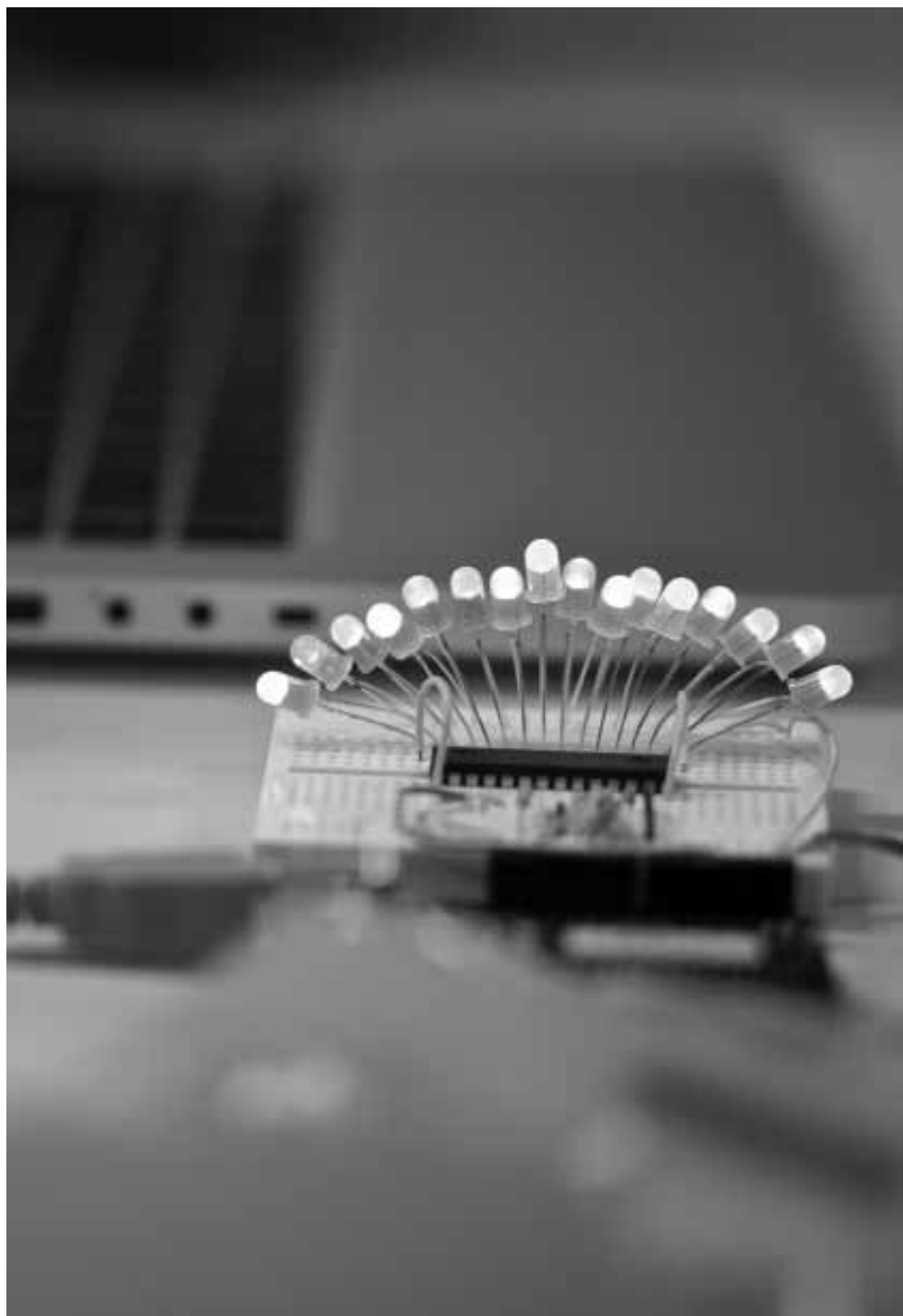
You can also download a copy of our Funding your Postgraduate Study booklet, also available from the contacts listed on page 20.

## Fees

For up-to-date information on fees, please see the Postgraduate Prospectus, or visit [www.goldsmiths.ac.uk/costs/pg](http://www.goldsmiths.ac.uk/costs/pg). Please note: fees are quoted per year of study.

## Open days

If you're thinking of studying at Goldsmiths, we recommend you come and visit us to have a look around. Our open days are ideal opportunities to meet tutors and current students, explore the campus, and find out more about what Goldsmiths can offer you. If you'd like further information, please visit [www.goldsmiths.ac.uk/opendays](http://www.goldsmiths.ac.uk/opendays).



# MSc in Computing

1 year full-time or 2 years part-time

A new addition to our postgraduate portfolio, the MSc in Computing aims to give students a broad and thorough grounding in interdisciplinary computing, with a solid focus on rigorous and industry-relevant technical skills. The course takes place in two dedicated state-of-the-art labs, providing facilities for training in 2d and 3d graphics programming, digital signal processing for audio and video, physical computing, full body motion capture, audiovisual interaction, robotics and mobile computing, including iPhone/iPad development. If you have an interest in creative coding, we can offer you an exciting, challenging and very rewarding experience at Goldsmiths.

In our interdisciplinary atmosphere, you will work with artists to develop software that is both technically cutting edge and represents new creative thinking about how we interact with computers.

## What do you study?

### Programming

You will learn a solid foundation in C++ and GPU programming from top-level researchers and veterans of the Computer Games Industry, the most demanding modern industry for programmers.

### Mathematics

You will learn the mathematical foundation of graphical and audio-visual software.

### Workshops in Creative Coding

You will apply your C++ programming skills to creating interactive computing systems using a range of novel interface technologies such as the iPhone, OpenFrameworks, Arduino, Motion Tracking and robotics.

### Electives

This consists of a number of optional courses on a range of interdisciplinary topics such as artificial intelligence, computer vision, audio engineering, physical computing, animation and cognition.

### What are the admissions criteria?

You should have an undergraduate degree of at least an upper second class standard in computing, engineering or mathematical sciences, and an interest in, and capability for, working in interdisciplinary contexts. In exceptional circumstances, outstanding practitioners or individuals with strong commercial experience may be considered. If your first language is not English, you should normally have a minimum score of 6.5 in IELTS or equivalent.

For more information visit [www.goldsmiths.ac.uk/pg/msc-computing/](http://www.goldsmiths.ac.uk/pg/msc-computing/).

# MSc in Cognitive Computing

1 year full-time or 2 years part-time

The MSc in Cognitive Computing has been specifically developed to take graduates from a wide range of backgrounds and critically introduce them to classical computational models of cognition and artificial intelligence in the context of a broad exploration of radical new theoretical approaches, characterised by their emphasis on embodiment, enactivism and European phenomenology.

The programme will provide students with market-led practical skills in object-orientated programming and the technologies of thought, alongside core conceptual understanding of cognitive processes and rigorous research and analytic skills.

## What do you study?

### Preliminary Week Programming Principles

For those with no computing background, an intensive course in Programming Principles takes up the whole of the first week of the autumn term. If you have previous computing experience, you may obtain an exemption.

### Terms 1 and 2

The programme will consist of four compulsory courses, covering topics including computing machinery and intelligence – the fundamentals of computing, program speed-up, limitations of computing, what is a computer; the philosophy of artificial intelligence – critical review of key papers in the foundations of artificial intelligence, problems with computationalism – review of critiques by Dreyfus, Searle, Varela, Brooks, Penrose, Putnam, van Gelder etc. The compulsory courses are:

- The Computer and the Mind
- Consciousness and Computations
- Embodiment and Enactivism
- Advanced Topics in Cognitive Computing

In addition, students will take one of the following compulsory courses:

- Introduction to Programming
- OR
- Programming for the Artists
- OR
- Advanced Programming

Students can also select two optional 15 credit courses (or one 30 credit course) in any the following areas:

- Artificial Intelligence
- Neural Networks
- Physical computing
- Semantic Web
- Workshops in Creative Coding
- Artificial Intelligence for games & special effects

### What are the admissions criteria?

You should have an undergraduate degree of at least second class standard with Maths at GCSE or equivalent and, if your first language is not English, you should normally have a minimum score of 7.0 in IELTS or equivalent, including 7.0 in the written element.

The modular structure and choices provided by this programme enable it to be equally accessible and challenging to students with a background in the pure sciences, the applied engineering sciences (including computing) and the arts/humanities (including psychologists, linguists and anthropologists). The award of MSc emphasises the technical focus to the interdisciplinary content of the degree.

For more information visit [www.goldsmiths.ac.uk/pg/msc-cognitive-computing/](http://www.goldsmiths.ac.uk/pg/msc-cognitive-computing/).



# MSc in Computer Games and Entertainment

1 year full-time or 2 years part-time

This degree offers a unique curriculum for graduates and professionals in various fields who either want to enter the Computer Games and Entertainment industries, or want to upgrade their present knowledge and skills on the basis of their experience in such industries.

This programme is the only MSc of its type in London and the South East. We are also only 20 minutes by train from Soho (home of the UK special effects industry).

The MSc is focused on advanced programming in C++, teamwork, and new technologies (procedural processing, GPU and parallel platforms, mobile platforms, advanced AI in games, etc). It integrates state-of-the-art technologies in its lab and coursework (games engine, consoles, etc). The programme is directed and taught by experts in research and development (in graphics, geometry, AI, hard-core processing), in the games and entertainment industries (many faculty members have either run, worked in or funded companies), and visiting tutors who are actively involved in these industries.

## Entrance requirements

We welcome applications from people with diverse backgrounds whose interests focus on the general area of computer games and entertainment. You should normally hold, or expect to hold, a first degree of at least upper second standard in computing, engineering, Maths or a scientific discipline.

This MSc has a strong programming component so it is important that applicants have good programming expertise (in addition to good ideas) and would not be suitable if you only have digital art skills such as 2D/3D Modelling, eg 3dsMax/Maya and/or Photoshop.

You will be required to demonstrate a good level of programming knowledge in a major language (eg C, C++ or Java). This may be verified by either a test or an interview with a practical request to implement some well-known method or algorithm.

## What do you study?

### Core courses

#### Advanced programming

This course will give students a firm grounding in software creation and architectural development as it relates to modern games development as a specialised branch of software engineering. The course is grounded in objected oriented development, using a range of programming languages, including C++, C# and Python to enable students to gain a strong understanding of object oriented methods in general and to gain an appreciation of OO design patterns for games development. The course focuses on the relationship between programming languages and hardware, particularly rendering hardware, through the study of DirectX and OpenGL|ES for particular purposes, namely PC, Microsoft's Xbox, or Sony's PSP.

#### Games & Interactive Entertainment Industries

This course will give students a solid understanding of the industries of (computer) games and interactive entertainment, inclusive of special effects for films and animations. This course gives an overview of the industries and teaches students the main management methods used in practice. Key topics covered include: (i) How the industry works across all the domains, (ii) How games are made: Considering games development from concept to shrink wrap, (iii) How development is different for different domains: Approaches to developing games, the use of middleware and tools, (iv) Team work: The role of the team within development - How to make teams work (Tuckman, Empowerment, psychology, etc.) This highlights the positive sides of crunch and the death march, but also highlights the issues of those approaches, (v) Entrepreneurship: How to do it yourself.

### **Maths and Graphics for Computer Games**

The course is focused on mathematics fundamentals for 3D graphics in computer games and entertainment systems, including Linear Algebra (vector, matrices and applications), a Calculus refresher, a Differential Geometry primer, and a Topology primer. A basic introduction to maths for computer graphics is covered, and the maths needed for ray tracing, rendering, (incl. Radiosity, BRDFs, etc.) is studied. Maths to prepare for physics and animation is also introduced including: tangents vs. speed, curvature vs. acceleration, and optimisation techniques.

### **Other important taught modules include:**

AI for games  
Physics for games  
Tools and Middleware

### **Final project**

Work is done either in small teams or on selected individual research projects. Typical examples of final projects include designing and building a level of a complete 'first playable' prototype game (or 'the vertical slice') for PC, or consoles or mobile platforms, of a quality to be suitable to be shown to a publisher. The dissertation (typically 10,000 words) is written with a presentation and demo component. Alternatively, a student able to find placement in a games studio (or equivalent), can do a viva report on their work and experience during that internship.

For more information visit  
[www.goldsmiths.ac.uk/pg/msc-cge](http://www.goldsmiths.ac.uk/pg/msc-cge).



# MA in Computational Arts

1 year full-time, 2 years part-time.

Our MA in Computational Arts aims to help you to develop and apply skills in computational technology through arts practice, whilst simultaneously providing the opportunity to integrate your practice within our environment of world-leading research. The programme takes place in two dedicated state-of-the-art labs, providing facilities for training in 2d and 3d graphics programming, digital signal processing for audio and video, physical computing, full body motion capture, audiovisual interaction, robotics and mobile computing, including iPhone/iPad development.

## Special note on admissions:

To study for the MA in Computational Arts, you will need to enrol onto the MFA in Computational Studio Arts. You can then choose at the end of year 1 (if you are full-time) or year 2 (if you are part-time) whether to end your studies and leave with the MA, or whether to continue on to the MFA.

## What do you study?

### Programming for Artists

This course provides students with the tools they need to creatively apply programming skills to their own practice. It encourages a practical and theoretical engagement with computer programming. Visits from guest speakers and student-led discussions encourage and enhance critical awareness of the issues surrounding computer art. Students will be expected to undertake small-scale programming projects.

### Creative Technologies and Art Practices

Often provocative and engaging, this course addresses significant issues relating to contemporary society. Seminar-based, it establishes a framework for reading key texts and a discussion forum that explores the relationship between the arts and technology. Our study will begin with artistic manifestations that relate to earlier technologies, as well as to video art and multimedia installations. We will examine examples of Internet art, computer-based installations, virtual reality, telematic presence and other interactive strategies; in addition, we will consider the significance of selected techno-performances, artificial life, robotics, wearable computers and 'cyborg' artworks.

We will have access to and visit the Computer Arts Society archive in the Print and Drawing rooms and the Victoria and Albert Museum. Assessment by: an essay of up to 2,500 words, and a 1,500-word evaluation report.

### Workshops in Creative Coding

This course aims to offer students at Master's level the opportunity to develop skills in applied audiovisual computing through a series of workshops and project sessions. The topics delivered in this course cover creative software development in C/C++, audio and graphics programming for embedded systems (iPhone and iPad).

### Electives

A number of optional courses on a number of interdisciplinary topics such as artificial intelligence, computer vision, audio engineering, physical computing, animation and cognition are available.

### What are the admissions criteria?

You should have an undergraduate degree of at least upper second class standard, and a portfolio of work (supplied either as a DVD or a URL directing to a relevant web page). If your first language is not English, you should normally have a minimum score of 6.5 in IELTS or equivalent (although exceptions to this may be made if you have sufficient life/work experience).

For more information, please visit [www.goldsmiths.ac.uk/pg/ma-computational-art/](http://www.goldsmiths.ac.uk/pg/ma-computational-art/).

# MFA in Computational Studio Arts

2 years full-time

This interdisciplinary programme has been designed to enable you to develop your individual and collaborative artistic practices, computational skills, and conceptual framework so that you can participate in shaping the use and understanding of new technologies and cultural practices at the highest level. The MFA is a studio-based programme underpinned by the necessary technical, theoretical, curatorial and historical background, allowing you to mediate between the worlds of visual, performing and relational (or interactive) art, technology and computer science.

## Entrance requirements

You should normally have, or expect to gain, a first degree of at least upper second standard in an appropriate subject. We welcome applications from EU and international students.

## What do you study?

### Year one

Year one shares the same core learning as our MA Computational Arts programme.

### Programming for Artists

This course provides students with the tools they will need to creatively apply programming skills to their own practice. It encourages a practical and theoretical engagement with computer programming. Visits from guest speakers and student-led discussions encourage and enhance critical awareness of the issues surrounding computer art. Students will be expected to undertake small scale programming projects.

### Creative Technologies and Art Practices: Re-Thinking Curating

To better understand the relevance of current art practices employing new technologies, we will begin our course by situating such art in an (art) historical context. We will consider how art after new media requires curatorial strategies which are often difficult to classify according to previous museological canons and geographies. Some argue (Graham & Cook 2010) that work involving interactivity, networks and computation is often about process, behaviour rather than objects. How do these issues impact on what you do and how your work is disseminated to the public?

### Workshops in Creative Coding

This course aims to offer students at Master's level the opportunity to develop skills in applied audiovisual computing through a series of workshops and project sessions. The topics delivered in this course cover creative software development in C/C++, audio and graphics programming for embedded systems (iPhone and iPad).

### Electives

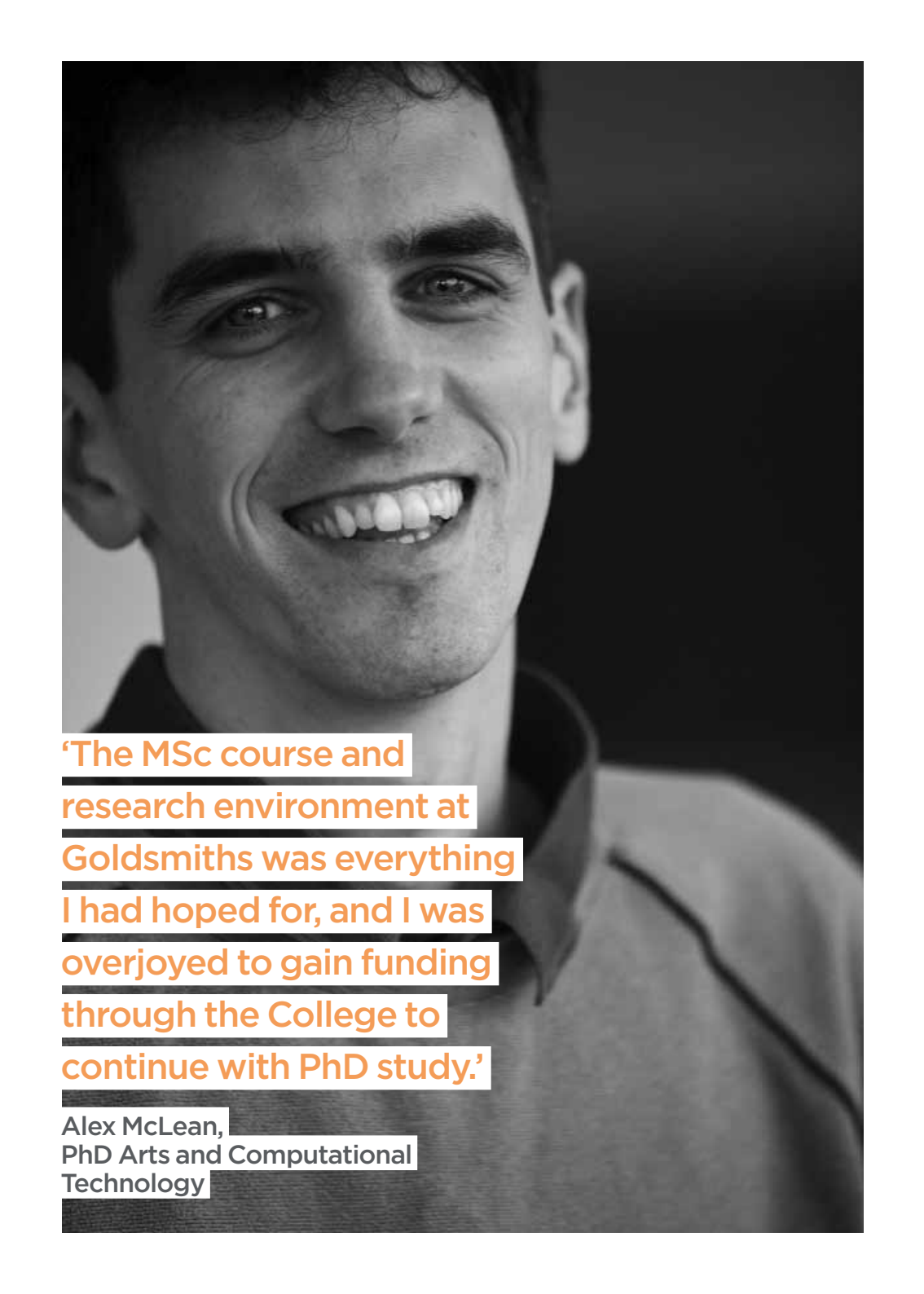
A number of optional courses on a number of interdisciplinary topics such as artificial intelligence, computer vision, audio engineering, physical computing, animation and cognition are available.

### Year two

In year two, you will continue to selectively tailor your learning experience and educational objectives. A specially designed MFA 'mentor class' will pair you with an eminent artist/designer/writer/curator. The mentors are selected from individuals who have continually broken new ground and sustained a creative, critical, and strongly conceptual practice in their area. Some of the current mentors in the programme include Andrew Shoben, Jane Prophet, Irini Papadimitriou (digital programme, V&A), and other visiting artists as appropriate to your practices. Assessment by: exhibition; one self-evaluation reports (2,500 words respectively); research paper of no more than 6,000 words; viva voce with exhibition of final work.

For more information visit [www.goldsmiths.ac.uk/pg/mfa-computational-studio-arts/](http://www.goldsmiths.ac.uk/pg/mfa-computational-studio-arts/).

Between years one and two, students have the opportunity to work with the Universities of Paris 8, and Valencia, and the Athens Academy of Fine Arts. This collaboration happens in Delphi, Greece on an annual basis until 2012.



**'The MSc course and  
research environment at  
Goldsmiths was everything  
I had hoped for, and I was  
overjoyed to gain funding  
through the College to  
continue with PhD study.'**

**Alex McLean,  
PhD Arts and Computational  
Technology**

# MPhil and PhD in Computing

Areas in which we offer MPhil/PhD supervision include computational creativity, generative music systems, music analysis, computer vision, interactions between art and technology, adaptive hypermedia systems, intelligent agent theories, databases and information systems, program transformation and analysis, design and analysis of algorithms, neural computation, genetic algorithms and artificial intelligence.

Initially, you should identify the area you wish to work in and a suitable supervisor. To help you do this you should examine the research backgrounds of all the members of staff in the Department. Information on the research interests of all members of the Department of Computing can be found on page 18 and at [www.goldsmiths.ac.uk/computing/staff](http://www.goldsmiths.ac.uk/computing/staff).

Once you have identified an area for research and a possible supervisor, you should contact the member of staff to agree supervision before you apply.

The Goldsmiths MRes/MPhil/PhD Application form is available to download at [www.goldsmiths.ac.uk/apply](http://www.goldsmiths.ac.uk/apply).

## Registration and study

Normally all students initially register for an MPhil (Master of Philosophy) programme; this is designed to ensure that you receive the foundation and training in the research methods necessary to complete a Doctoral (PhD) thesis. When you have satisfactorily completed an agreed part of the research and training programme, you may apply to upgrade to PhD registration; this will usually be after 18 months if you are studying full-time, or 24 months if part-time. You should aim to complete and submit your PhD thesis within an agreed period, usually three to four years for full-time students, and four to six years for part-time. If you do not wish to upgrade to PhD registration, you may submit your thesis for an MPhil after two years if you are studying full-time, or after three years if part-time.

With the agreement of your supervisor, you can change your registration from full-time to part-time or vice versa; the necessary form is available from the Student Enrolments and Records Office.

## Research supervision

You are assigned two members of staff qualified to supervise your research throughout your period of registration. Please see page 18 for details of the staff and their research interests.

## Research training programme

Training in research methods and skills are provided both by the Graduate School and the Department, beginning with an intensive week-long introduction in the first week of enrolment, and continuing later in the first term with sessions focusing closely upon the specific challenges of literary and linguistic research projects.

## Assessment

Examination of the MPhil and PhD is by a major thesis (not more than 60,000 words for an MPhil and not more than 100,000 words for a PhD) and a viva voce.

## Entrance requirements

We usually expect you to have a Master's degree, or to be studying for one at the time of your application. However, we do make exceptions to this – please enquire about your eligibility.

# MPhil and PhD in Arts and Computational Technology

In 2006, we pioneered a unique PhD programme in Arts and Computational Technology that embraces arts and technology-based practice within the Department. For the first time in the University of London, students are able to include creative work and a substantial contextualisation of their practice within the growing and distinctive field of arts, technology and new media art. You are expected to engage both with artistic practices and computational technologies. We are not overly prescriptive about what the projects will be, as different students will have different mixes but your project should broaden the range of technologies that can impact on arts practices and/or broaden the kinds of art and dissemination possibilities afforded by new computational technologies; these may include installation, digital fiction, performance and curatorial strategies.

## Research training programme

Research training for both full- and part-time students is provided both by the Department and the Graduate School. Practice based methods/ methodologies are embedded in the weekly PhD research seminars where you will present your research in progress and ideas to your peers within and external to the Department. You are expected to give two presentations per year and to attend Graduate School seminars and Spring Review week.

## Research supervision

All students have two supervisors, one from arts practice and one from creative technologies. This combination reflects and embeds the principle of interdisciplinarity. Supervisors are also drawn from the Centre for Cultural Studies, and the Departments of Sociology, Design, Media and Communications and Drama. There are annual joint seminars with the Department of Design.

## The Thursday Club

The Thursday Club is an open forum for anyone interested in the theories and practices of multidisciplinary, interactive technologies and philosophies of the state-of-the-art, in current and future cultural landscape(s).

The Club features events in the Ben Pimlott building at Goldsmiths, which are free and open to everyone to attend. All Goldsmiths students (and staff) are encouraged to participate in and present their work individually and with others at the Thursday Club.

For more information check [www.goldsmiths.ac.uk/gds/events](http://www.goldsmiths.ac.uk/gds/events).

## Entrance requirements

We normally expect you to hold an upper second class honours degree in a creative practice (eg art, design, music, technology, social sciences) or computer-based discipline (including studio arts) or a MA/MFA and/or equivalent technical and artistic experience in arts and computational technology.

## Current research

Please see page 18 for information on staff and their research interests.

## Assessment

Written thesis (60-80,000 words), plus a practical/ technological component in an appropriate form.

## Public Impact

Assessment of the specific training requirements of each student's project on both PhD programme is followed by guidance on specialist seminars, conferences and exhibitions/public outputs that have public impact supported where possible by departmental funding. Recent examples include ISEA, Sigrapph and Kinetica Art Fair.



# Staff and their research interests

## **Dr Mark Bishop BSc PhD (Reader)**

Stochastic diffusion processes, new agent-based approach to search and optimisation, cybernetic approaches to artificial intelligence, and the philosophy of artificial intelligence.

## **Dr Tim Blackwell BSc MSc DPhil**

Artificial intelligence, algorithms inspired from natural systems, live algorithms in music performance, digital creativity, swarm intelligence, evolutionary computation, and global optimisation.

## **Professor Michael Casey BA MA PhD (Professor of Computing)**

Signal processing (audio/speech/music), machine learning/pattern recognition, generalised sound recognition, applications of MPEG-7, multimedia descriptions, real-time music performance systems, generative music systems, and music structure analysis.

## **Dr Sebastian Danicic BSc MSc PhD**

Modelling, program transformation, program slicing, programming language semantics, declarative languages, music notation processing, object-orientation, formal methods and Java.

## **Dr Kate Devlin BA MSc PhD**

Computer graphics, image display, visual perception, archaeological computing - visualisation and representation.

## **Professor Mark d'Inverno MA MSc PhD (Head of Department; Professor of Computing)**

The theory and application of intelligent agent systems - biological modelling, art and design. Current projects include the modelling of stem cells, online electronic institutions for e-commerce, smart devices for energy conservation, and the interactive analysis of musical composition and performance.

## **Dr Marco Gillies MA PhD**

Interactive virtual characters for social virtual environment and games. Computer animation with a focus on motion capture and data driven animation. Expressive non-verbal communication for virtual characters. Full Body Interaction Techniques.

## **Dr Mick Grierson BA PhD**

Cognition and perception, audiovisual art and composition, signal processing and segmentation, brain-computer interfaces (EEG), information retrieval, gaming, live electronics, accessibility, experimental electronic improvisation, live cinema, sound and cinema, avant-garde and experimental cinema.

## **Dr Rodger Kibble BA MA MSc PhD**

Artificial intelligence, formal and computational semantics of natural language, natural language generation and theories of rational agency.

## **Professor Janis Jefferies BA MFA (Artistic Director of Digital Studios; Professor of Visual Arts)**

Artist, writer and curator with particular research interests in digital art and sound. Current research investigates the relationship between text, textiles and technology as well as access to cultural artefacts through haptic devices.

## **Professor William Latham BA MA (Professor of Computing)**

A designer of computer games, a computer artist and entrepreneur. Expertise in evolutionary art, graphics, generative art, genetics, and the entertainment and video games industries.

## **Professor Frédéric FoI Leymarie BEng MEng PhD (Professor of Computing)**

Three-dimensional shape representation in computer vision and perception, computational geometry, architectural information systems, information visualisation and arts computing in general.

## **Dr Nikolay Nikolaev BSc MSc PhD**

Evolutionary computation, genetic algorithms and genetic programming, neural networks, biocomputation, machine learning, applications to time-series prediction, financial engineering and data mining.

## **Dr James Ohene-Djan BSc MSc PhD**

Adaptive and personalisable hypermedia, hypertext telecommunications systems and e-commerce, user interface design and web-based database systems.

**Professor Jane Prophet BA MA PhD**  
(Professor of Interdisciplinary Research)  
Digital art and media, art-science  
collaboration, interdisciplinary research.

**Dr Ida Pu BSc PhD**  
Probabilistic and average case  
algorithms, data structures, networks and  
communications and complexity theory.

**Dr Christophe Rhodes MA PhD**  
Statistical modelling and inference, music  
analysis and representation, user interfaces  
and language design and implementation.

**Professor Andrew Shoben ARBS**  
(Professor of Public Art)  
One of the leading UK artists working at the cutting  
edge of computer technology. He is founder of the  
Greyworld movement which has a rich track record  
of creating innovative artworks in public spaces.

**Dr Daniel Stamate MSc PhD**  
Deductive databases, information integration,  
logic programming, multivalued logics,  
reasoning under uncertainty and data mining.

**Dr Marian Ursu DipIng PhD**  
Artificial intelligence, knowledge-based systems,  
knowledge representations, ontologies, the  
semantic web, applications of artificial intelligence  
to design, tutoring and the cultural sector  
including museums and interactive TV.

**Professor Geraint Wiggins MA PhD**  
(Professor of Computational Creativity)  
Understanding creativity in machines and  
people. Artificial intelligence and cognition,  
intelligent sounds and music systems, cognitive  
aspects of music composition and performance,  
and systems for music education.

**Professor Robert Zimmer MA MPhil PhD (Technical  
Director of Digital Studios; Professor of Computing)**  
Artificial intelligence, theorem proving with  
applications to hardware and software design and  
verification, safety-critical systems, humanities  
computing, and digital multimedia with applications.



# Contact us

For any general queries once you have read this booklet and the relevant sections of the Postgraduate Prospectus, please contact the Department of Computing on +44 (0)20 7919 7850, fax +44(0)20 7919 7853 or e-mail [computing@gold.ac.uk](mailto:computing@gold.ac.uk).

If you have specific programme queries, you can also contact the following members of the Department:

**MPhil and PhD in Computing:**

Dr Mark Bishop on +44(0)20 7919 5048 or e-mail [m.bishop@gold.ac.uk](mailto:m.bishop@gold.ac.uk).

**MPhil and PhD in Arts and Computational Technology:**

Professor Janis Jefferies on +44 (0)20 7919 7681, e-mail [j.jefferies@gold.ac.uk](mailto:j.jefferies@gold.ac.uk) or Professor Robert Zimmer on +44 (0)20 7919 7596, e-mail [r.zimmer@gold.ac.uk](mailto:r.zimmer@gold.ac.uk).

**MFA in Computational Studio Arts:**

Professor Janis Jefferies on +44 (0)20 7919 7681, e-mail [j.jefferies@gold.ac.uk](mailto:j.jefferies@gold.ac.uk).

**MSc in Cognitive Computing:**

Dr Mark Bishop on +44 (0)20 7919 5048, e-mail [m.bishop@gold.ac.uk](mailto:m.bishop@gold.ac.uk).

**MSc in Computer Games and Entertainment:**

Professor Frederic Fol Leymarie on +44 (0)20 7919 5052, e-mail [ffl@gold.ac.uk](mailto:ffl@gold.ac.uk).

If you have any admissions questions, or you would like a prospectus, please contact us as follows:

**Admissions Office**

telephone +44 (0)20 7078 5300 (direct line),

fax +44 (0)20 7919 7509

e-mail [admissions@gold.ac.uk](mailto:admissions@gold.ac.uk)

Prospectus hotline: telephone 020 7919 7537 (24 hours)

**Did you find this booklet helpful?**

We would welcome any comments you have about the content or design of this booklet.

Please e-mail [ext-comms@gold.ac.uk](mailto:ext-comms@gold.ac.uk), or write to External Communications, Goldsmiths, University of London, New Cross, London SE14 6NW, stating the name of the booklet. All information is treated in the strictest confidence and will in no way affect any application you make to Goldsmiths; no personal data is kept on file.



## Our Mission

We offer a transformative experience, generating knowledge and stimulating self-discovery through creative, radical and intellectually rigorous thinking and practice.

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