

## MARGARITA DEKOLI

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## EDUCATION

MS Media Arts and Sciences, Massachusetts Institute of Technology, June 2003.

Grassroots Invention Group, Media Laboratory. MS Thesis Title: "*Coloring Time with CodaChrome*". Thesis project focused on children's temporal thinking and reasoning while using a custom-made system for graphically programming color patterns on tricolor LEDs. Advisor: Dr. Bakhtiar Mikhak. Thesis Committee: Bakhtiar Mikhak, Carol Strohecker, Walter Bender.

BS in Computer Engineering (5-year program), University of Patras, Greece, February 1997.

BS Thesis Title: "*Advanced Applications of Geographical Information Systems and Multimedia: The Archaeology Paradigm*". Thesis project focused on the development of an information system for the on-site documentation of an archaeological excavation using off-the-shelf GIS, database and multimedia tools to manipulate the spatial and descriptive attributes of the excavation process and findings. Advisor: Dr. Thanasis Hadzilakos. Thesis Committee: Thanasis Hadzilakos, Pavlos Spirakis.

## EXPERIENCE

Massachusetts Institute of Technology, Media Laboratory, Cambridge, MA, 2003-2006

[Lifelong Kindergarten Group](#)

*Software Engineer:* Designed (in a team of 5 people) and developed (team of 2) a new graphical programming language, called [Scratch](#) that enables kids and teenagers to create their own games, animations and interactive art. Scratch is based on the Smalltalk open source platform Squeak.

*Research Associate:* Planned and participated in observations of children using Scratch in a variety of settings and applications (mini-games, story-telling, animations etc.) Designed and ran workshops with additional technological tools like the PicoCricket (PicoCricket is a small toy-microcontroller that can be connected to and control lights, sensors, motors and other such devices plugged into it).

*User Interface Designer:* Designed parts of the Scratch UI (paint editor, file dialogs, interactive tools, dynamic highlight of running scripts) and participated in design reviews on all aspects of the Scratch UI.

*Support Materials developer:* Designed support materials for Scratch including help screens with illustrative scripts for every available command block. Created additional documentation in the form of tutorials, how-to guides, example Scratch projects etc.

Massachusetts Institute of Technology, Media Laboratory, Cambridge, MA, 2001-2003

Grassroots Invention Group

*Research Assistant:* Designed and developed the CodaChrome system, a software and hardware tool for programming the colors and color transitions on tricolor LEDs by novices and children. (CodaChrome's hardware core is a microcontroller and small tricolor LEDs that can be programmed to transition among different colors.) Designed and developed the java-based software programming environment for creating the animated colored light patterns. Used CodaChrome with children to create new forms of interactive jewelry and wearable art. Organized and developed activities mainly for children's workshops lasting from one day to two weeks involving participants ranging from 6 to 60 years of age. Led a multidisciplinary team of software and electrical engineers as well as artists, teachers and undergraduate students throughout the project.

*Teaching assistant:* Led class sessions and prepared materials and presentations for “The Nature of Constructionist Learning” class at MIT Media Laboratory.

Courseware at MIT involved projects implemented with technological tools developed by engineering groups at MIT, like a hypercube network switch modeled with Tower microcontrollers, and multiple projects based on the iPaq platform running Linux and utilizing technologies from [Project Oxygen](#) (pervasive computing).

Media Lab Europe, Dublin, Ireland, Summer 2002

Everyday Learning Group, Group director/Supervisor: Dr. Carol Strohecker

*Visiting Graduate Fellow:* Co-organized two week-long workshops each with 20 children and adult participants, called Electro-Jewels, using computationally enhanced materials (including CodaChrome) with traditional craft materials to create electronic jewelry and wearable art. Collaborated with professional jewelry designers, the Ark (a cultural center for children in Dublin) and researchers at Media Lab Europe. Developed a prototype of CodaChrome’s programming environment on the PocketPC platform using Embedded Visual Tools. <http://www.media.mit.edu/~margo/Electro-Jewels.htm>

Computer Technology Institute, Patras, Greece, 1997 - 2001

R&D Unit 3: Applied Information Systems, Director: Dr. Manolis Koutlis

*Computer Engineer:* Led the architectural design and implementation of a number of European Union and Greek R&D projects applying innovative technologies in the areas of learning research, math and science education, and foreign language learning. Led a team of 3 software developers and 5 teachers in developing production-quality educational software (**Xenios**) for the subject of foreign language learning in Greek high schools using the [E-slate](#) platform (component-oriented software platform for authoring educational software) and a hybrid system architecture designed by me. Authored educational software and developed educational activities for foreign language learning with a team of teachers using a variety of custom software tools in addition to commercial software such as Lotus Learning Space (Project **Mentor**, predecessor to Xenios). Designed and was responsible for the purchase of all the equipment used in Project **C<sup>3</sup>** (differential GPS, walkie-talkies, PDA, wireless GSM card, mobile phone). Supervised the software developed in all the above platforms to wirelessly transmit the real time GPS data to map generation software. Conducted feasibility studies and evaluated existing technologies for the creation of an architectural framework for the wireless interoperability of embedded and mobile devices (Project **e-Gadgets**). Designed and developed an information system (**SATEP**) for the archaeological documentation and excavation practice in Dispilio, Greece. Developed java-based software components for the educational software platform E-Slate. Used tools such as Java Development Kit, Java Media Framework and QuickTime for Java to develop components for music education software (Project **YDEES**). Defined project deliverables and presented results to representatives of the Greek Ministry of Development.

*Researcher:* Designed and implemented educational activities like map construction and treasure hunt to evaluate young children’s spatial awareness and understanding (Project **C<sup>3</sup>**). Collaborated with researchers from CTI’s research partner, the Educational Technology Lab of the University of Athens on a number of projects to provide customizations on the E-Slate platform to facilitate classroom observations.

*Support Materials Developer:* Co-wrote and was the editor of the Xenios software support materials handbook (foreign language learning). The book is published by CTI Press and is now part of the curriculum at the Greek Open University. Prepared support materials and held training sessions for archaeologists (Project SATEP).

*Coordinator/Supervisor:* Coordinated the Greek team in the European project **Mentor** (Collaborative Framework for Foreign Language Learning in High School using the

Emerging Multimedia Capabilities of the Internet). Defined project deliverables and presented progress reports at the EU headquarters. Defined and co-supervised a BS thesis titled "Organization of multimedia data from an archaeological excavation into a semi-structured database" (2001) which structured sample archaeological data using XML tools.

*On-site Coordinator:* Supervised the installation and maintenance of the on-site computer laboratory of the archaeological excavation of SATEP at Dispilio in Kastoria, Greece.

*Consultant:* Acted as technical and administrative liaison between CTI and Greek company-university consortia developing educational software (Project **Seirines**.) Evaluated project proposals. Consulted with consortia on both technical and educational content issues. Oversaw their software and support materials deliverables.

## AWARDS

I was awarded a Media Lab Europe Fellowship as an MIT Media Lab graduate student and I was re-elected for a second consecutive year, 2001-2003.

## COMPUTATIONAL TOOLS AND RESEARCH ENVIRONMENTS

### Massachusetts Institute of Technology, Media Laboratory

*Scratch* is a new programming language that enables youth at after school centers (Computer Clubhouses) to create their own animations, games, and interactive art.

2003-2006, Resnick, M., Maloney, J., Kafai, Y., Rusk, N., Silverman, B., Dekoli, M., et al. Funding: National Science Foundation (Grant No. 0325828), Intel Foundation, MIT Media Laboratory's Digital Life and Things That Think consortia.

*CodaChrome* is a system comprised of hardware and java-based software used by children to create and program electronic jewelry and wearable art, while researchers focus on the implications on such new media on the children's grasp of temporal concepts.

<http://www.media.mit.edu/~margo/codachrome.htm> 2001-2003, Dekoli, M., Mikhak, B., Gorton, T., Lyon, C., Bender, W., Strohecker, C.

### Computer Technology Institute, Patras, Greece

*Project C<sup>3</sup> (Children in Choros and Chronos)* developed a GPS enabled system transmitting wirelessly real-time data to E-Slate for map generation by 6-year olds communicating through walkie-talkies. C<sup>3</sup> focused on the spatio-temporal cognition of small children evaluated in activities like map reading, model constructing and navigating.

<http://www.cti.gr/RD3/C3/> 1998-2000, Dekoli, M., Koutlis, M., Vasiliou, G., Birbilis, G., Kynigos, C., Dimitrakopoulou, A., Giannoutsou, N. Funding: Esprit LTR i<sup>3</sup>, [Experimental School Environments](#).

*Project YDEES* aimed at developing exploratory learning environments for mathematics, geography, physics and music based on E-Slate, a component-oriented software architecture, with concurrent exploratory cultured classrooms in five primary schools.

1995-1998, CTI (project coordination), University of Athens, National Pedagogical Institute, Psychico College, Center of Contemporary Music Research, European Children's Television Center, et.al. Funding: Operational Programme for R&D (EPET II), Community Support Framework II 1994-99. Greek Ministry of Industry Energy and Technology, General secretariat for Research and Development.

*E-Slate* is an exploratory learning environment, where everyone can create highly dynamic software with rich functionality (microworlds) by visually manipulating pre-fabricated, interoperable software components. Both the software components and the microworld can be enhanced by programming in a Logo-based scripting language. E-Slate is based on the Java platform and related technologies.

<http://e-slate.cti.gr> 1993-2003 Koutlis, M., Hadzilacos, T., Kyrimis, K., Renieri, N., Kourouniotis, P., Oikonomou, A., Tsironis, G., Vasiliou, G., Kynigos, C., Dekoli, M., Birbilis, G., Drossos, N., Karagianni, E., Glezou, K., Dimopoulou, C., Mavrommati, E., Kameas, A., Psaltou, S.

*Project e-Gadgets (Extrovert Gadgets)* developed a conceptual framework called Gadgetware Architectural Style (GAS), to construct gadgetworlds (configuration of GAS-aware artifacts), which exhibits collective behavior that exceeds the sum of the individual capabilities of its artifacts.

2000-2002 CTI, University of Essex, Intelligent Inhabited Environments Research Group, U.K., National Microelectronics Research Center (NMRC-UCC), Ireland. Funding: [FET Proactive 2000 The Disappearing Computer](#) Action line: IST-2000-6.2.1.

## LEARNING ENVIRONMENTS AND SYSTEMS

### Computer Technology Institute, Patras, Greece

*Project MENTOR* involved the design and development of multimedia educational software for foreign language learning through the utilization of the internet with high school teachers as part of the development teams. In Greece, Mentor was implemented on the **Odysseas** school-network.

1998-2000, Partners: University of Hull (CDU) - UK, CTI - Greece, Limburgs Universitair Centrum (EDM) - Belgium. Funding: MM1017, EU Joint Call for Multimedia Educational Software, 1998-'99.

*XENIOS* is the continuation of the Mentor project where the greek software and materials were repurposed and extended, and a new hybrid system was developed for their delivery. Xenios has an ever increasing amount of users today in many Greek high schools.

<http://xenios.cti.gr>, <http://xenios.cti.gr/support> (sites in Greek) 2000-2001 Dekoli, M., Pasisi, K., Kokkas, N., Gipari, M., Gavriilidou, M., Dimopoulou, C., Zervou, M., Papaioannou, P., Karageorgiou, S., Kosmopoulou, E., Kouroukli, M., Koutlis, M., Tsiornis, G., Vasiliou, G., Kynigos, C., Psaltou, S., Lukoudi, K.

*Projects Odysseas, Seirines, Nafsika: Action [Odysseia](#)* was a cluster of 19 projects aiming at the incorporation of computers and network technologies in everyday school practise for all disciplines in more than 300 high-schools in Greece. It built the school labs' infrastructure, developed educational software, educated 100 teacher trainers and educated around 6.000 school teachers. [Odysseas](#) was a pilot project for the first 30 schools. [Seirines](#) and [Nausika](#) were the pilot projects for the educational software development and their successful outcomes were produced in large scale.

<http://odysseia.cti.gr/English/ODYSSEIANEW/about.htm> 1998-2002, Greek Ministry of Education, Computer Technology Institute, National Pedagogical Institute. Funding: Operational Programme for Education and Initial Vocational Training funded by the 2nd European Community Support Framework.

## ARCHAEOLOGICAL TOOLS AND SYSTEMS

### Computer Technology Institute, Patras & Prehistoric Excavation in Dispilio in Kastoria, Greece

*Project SATEP* involved the design and development of the information system SATEP for the archaeological excavation and documentation in the prehistoric excavation in Dispilio, Greece. The system consists of a database (photographs and documents) linked to a GIS system (ESRI/Arcview) for spatial information processing and retrieval.

1998-2001 Dekoli, M., Damianidis, D., Hadzilacos, T., Varelas, G., Hadzilacos, G. (CTI), Hourmouziadis, G., Sofronidou, M., Almatzi, A (University of Thessaloniki, Greece).

### Department of Computer Engineering and Informatics, University of Patras & Computer Technology Institute, Patras, Greece

*BS thesis project*, focused on the porting of a system for the archaeological excavation documentation of the *Toumba excavation* in Thessaloniki in Greece, previously developed on a Sparc Sun Station in UNIX with heavy-weight software packages. It was reimplemented for the PC platform using more lightweight software packages that could run on a laptop and thus be useful for the capture of documentation information on-site

rather than later in the day transcribed from notes. I designed the hyperlinked excavation archive as a web site that pulls data from the database and the GIS system.

1996-1997, Dekoli, M., Stoumbou M., Tsironis, G., Hadzilacos, T.

## TALKS AND PRESENTATIONS

Multiple presentations of the CodaChrome and Scratch projects at consortia meetings and open houses at the MIT Media Laboratory, 2001-2006.

Talk at the 1st Conference for the Utilization of Educational Technology in the didactic practice: Educational Software – Internet, organized by the Secretariat of Secondary Education of the Cyclades and the Greek Pedagogical Institute. Paper presented: Dekoli, M. "Xenios: Educational software and activities for the support of foreign language teaching in schools". Syros, May 2001.

Presentation at the Goethe Institut Athen at the Conference of teachers of the German language in Greece (Griechischer Deutschlehrerverband). Paper: Pasisi, K. & Dekoli, M. "Teaching German in the programme MENTOR in the schools of the Odysseas network". Athens, April 2000.

Multiple presentations and training on the software and educational activities produced for the field of Foreign Language Learning (Project Mentor) to: teachers of foreign languages in secondary education in Greece, foreign language teachers' trainers of the Odysseia project, the "Linguaphone" company, computer scientists & developers for the E-Slate platform, 1998-2000.

Multiple presentations, poster presentations and demos for the annual review conferences of the C<sup>3</sup> project, in Sieges - Spain, Jönköping - Sweden and Athens - Greece.

"The GPS goes to primary school: The example of a GPS system in co-operation with educational software for primary education", presentation of the hardware configuration for the wireless transmission of GPS data to educational mapping software, Meeting of GPS users, Athens, February 2000.

"Software components for music based on the E-Slate platform", demonstration at the "New Tools in Education: New practices?" workshop organized by Computer Technology Institute, Athens, September 1998.

"A GIS- and hypertext-based system for excavation documentation", paper presented at the 25th International Conference of Computer Applications and Quantitative Methods in Archaeology (CAA), Birmingham, April 1997.

"A GIS- and hypertext-based system for the excavation documentation", presentation of the application of GIS in the documentation of an archaeological excavation, Meeting of Arc/Info users, Athens, November 1996.

## PAPERS, DEMOS AND PUBLICATIONS

Dekoli, M., Mikhak, B. 2004. "CodaChrome: a system for creating interactive electronic jewelry for children", demo at *Interactive Design and Children*, University of Maryland, College Park, Maryland.

Hadzilacos, Th., Dekoli, M. 2002. "The Utilization of Computing Technology for Excavation Documentation: Dispilio 1998-2000", Proceedings of *International Symposium in the Memory of D.R.Theocharis*, Thessaloniki-Kastoria, 26-28 November 1998, 421-430.

Dekoli, M. (editor). 2001. "Xenios: Educational activities and software for Foreign Language Learning in school 2.2" CTI Press, Athens, Greece. Authors: Dekoli, M., Gavrielidou, M., Dimopoulou, C., Gupari, M., Kokkas, N., Pasisi, K.

Dekoli, M. May 2001. "Xenios: Educational software and activities for the support of foreign language teaching in schools". 1st Conference for the *Utilization of Educational Technology in the didactic practise: Educational Software – Internet*, organized by the

Secretariat of Secondary Education of the Cyclades and the Greek Pedagogical Institute. Syros.

Pasisi, K., Dekoli, M. April 2000. "Teaching German in the programme MENTOR in the schools of the Odysseas network", Conference of teachers of the *German language in Greece (Griechischer Deutschlehrerverband)*, Goethe Institut Athen. Athens.

Koutlis, M., Dekoli, M., et al. July 1999. "E-Slate: a kit of educational components", *International Conference on Artificial Intelligence in Education (AI-ED) '99* (poster presentation), Le Mans, France.

Dekoli, M., Hadzilacos, Th. April 1997. "A GIS- and hypertext-based system for excavation documentation", 25th International Conference of Computer Applications and Quantitative Methods in Archaeology (CAA), Birmingham, UK.

## **THESES**

Dekoli, M. 2003. "Coloring Time with CodaChrome". Master's thesis, Grassroots Inventions Group, Media Laboratory, Massachusetts Institute of Technology.

Dekoli, M. 1997. "Advanced Applications of Geographical Information Systems and Multimedia: The Archaeology Paradigm". Bachelor's thesis, School of Computer Engineering and Informatics, University of Patras, Greece.

## **PROFESSIONAL AND COMMUNITY SERVICE**

Mentor on Scratch projects, **Computer Clubhouses** in the Boston area, Boys and Girls Clubs of Charlestown & Chelsea, MA, 2003-2006.

Reviewer, Educational Software Packages, Project **Nafsika**, Action Odysseia, Athens, Greece, 2001.

Reviewer, Educational Software Development project proposals, Project **Seirines**, Action Odysseia, Athens, Greece, 1999.