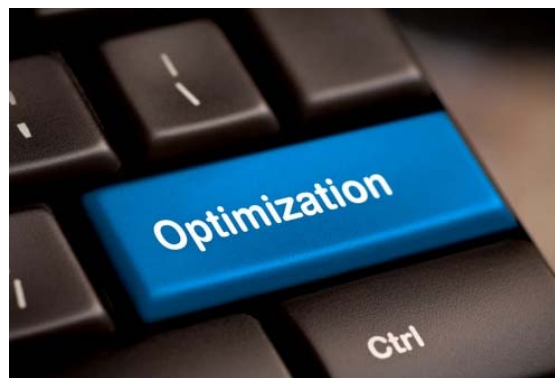
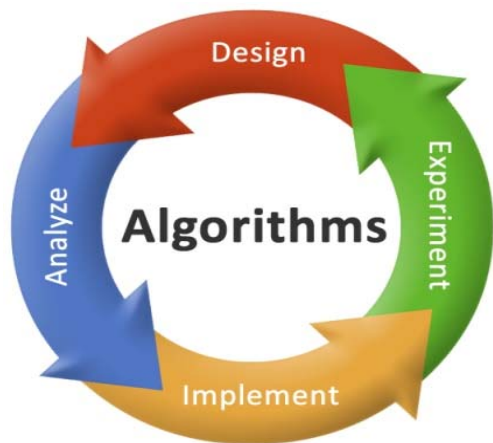


# ALGOCUR Research Activities



**ALGOCUR Research Group**  
**Head: Christos Zaroliagis**





- **First ever** Computer Science & Engineering department established in GR (1978)
- **Faculty: 27+** (most of them internationally renowned scientists in their field)
- **Research**
  - Algorithms, complexity, optimization
  - Big Data Management
  - Cloud computing & virtualization
  - High performance computing
  - Parallel, distributed & mobile computing
  - Computer architecture
  - Networks
  - Internet of Things
  - Bio-/Medical informatics
  - Cryptograph & security
  - Embedded systems
  - Microelectronics
  - Signal processing & communication
- Major **self-funded** R&D Institute in GR
- **Employs > 300:** senior & junior researchers, post-docs, pre-docs, engineers, supporting IT & admin staff
- **Last 5 years:** > 130 R&D projects
  - Substantial **basic & applied research**  
*Algorithms, complexity & optimization, wired/wireless/sensor networks, computer and network security, ubiquitous and distributed computing, e-learning & digital content, complex information systems, production systems, embedded systems, integration and sustainable development*
- Technical **Consultant and Service Provider** of the **Greek Ministry of Education**
  - *Education, life-long learning, e-infrastructure, Greek School Network*

# ALGOCUR core team



**Christos Zaroliagis**  
Professor, Uni Patras  
**Head of ALGOCUR**



**Damianos Gavalas**  
Assoc. Professor  
CTI & Uni Aegean, GR



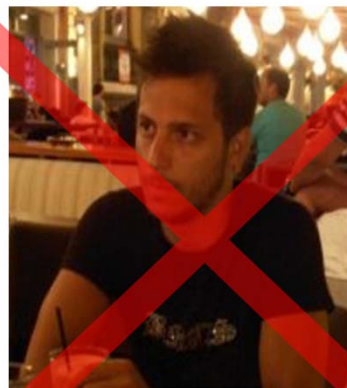
**Spyros Kontogiannis**  
Assoc. Professor  
CTI & Uni Ioannina, GR



**Grammati Pantziou**  
Professor, CTI & Uni  
Western Attica, GR



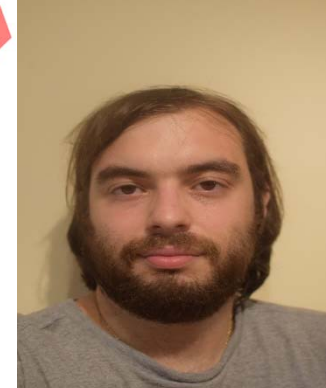
**Dr Lina Giannakopoulou**  
CTI & Uni Patras, GR



**Dr Vlasios Kasapakis**  
CTI & Uni Aegean, GR



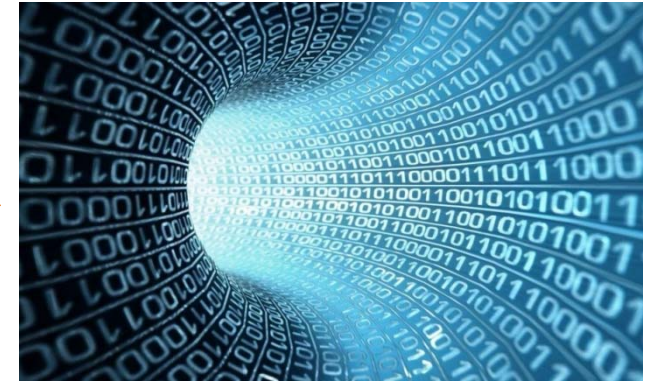
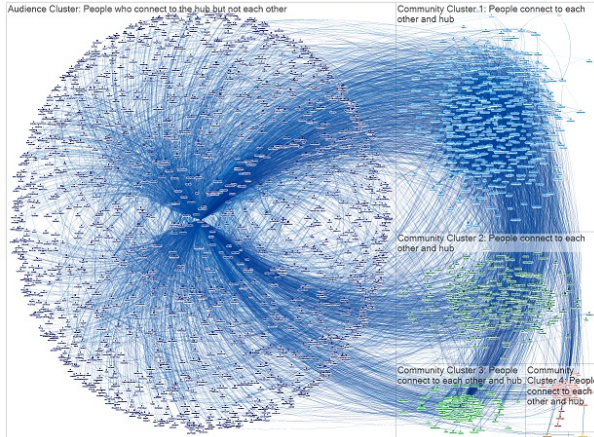
**Andreas Paraskevopoulos**  
PhD candidate  
CTI & Uni Patras, GR



**Nikos Vathis**  
PhD candidate  
CTI & NTUA, GR

- 3 MSc students
- 6 undergrads

# ALGOCUR Vision



Need

**Principles** to understand behavior

**Methods** to optimize/automate their function and services

**Approaches** to collect, represent, (securely) route, and manipulate big data

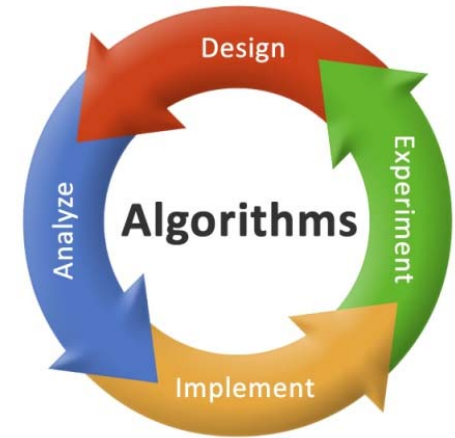
Integrated View

Fundamental **algorithmic, optimization & security** principles

**Application** of derived principles **in practice**

# Current Research

- **Innovative Algorithmic Technology**
- **Data-driven and scalable computing**
- **Large-scale Optimization**
  - Robust and online optimization
  - Multiobjective optimization
- **Intelligent Transportation Systems and Services**
  - Route & itinerary planning
  - Tourist tour planning
  - Intelligent mobility services
  - Robust line planning
  - Vehicle routing
- **Decentralized Computing**
  - Parallel, Distributed, and Mobile Computing
  - Network simulations and cloud computing
- **Mobility in Smart Cities**
- **Cryptography and Information Security**
- **Web Searching and Applications**
- **Software engineering and educational e-platforms**
- **Augmented and virtual reality**



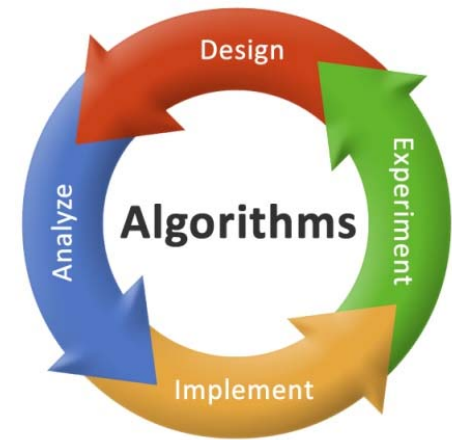
# Research in ITS & Mobility

## Data-Scalable Algorithmics

- Dynamic structures
- Decentralized infrastructures

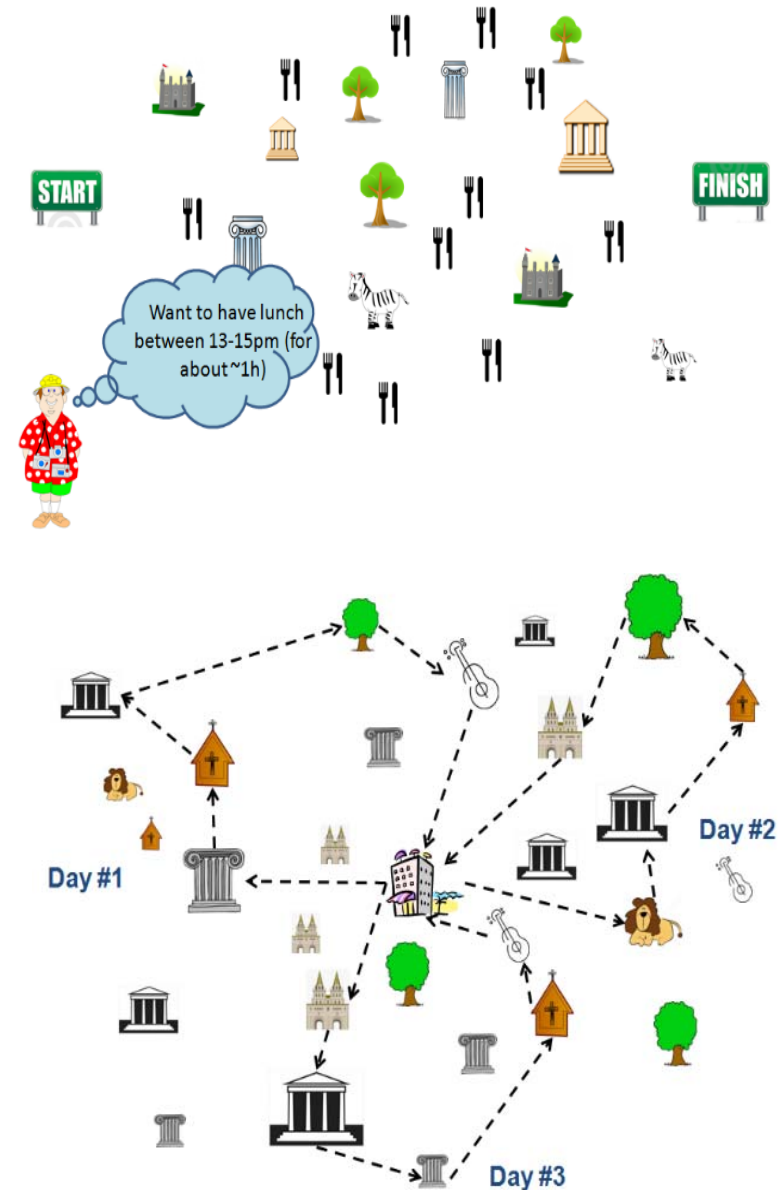
## Network-Driven Algorithmics

- Route/Itinerary planning
  - **Optimal Itineraries** (public transport networks)
  - **Time-dependent** routing (road networks)
- Renewable mobility in smart cities
  - **Dynamic**/multi-modal/multi-objective routing
  - **Tourist Trip** planning
- Robust optimization
  - Line planning (public transport networks)

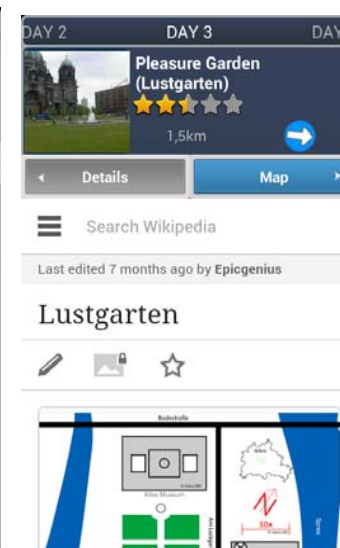
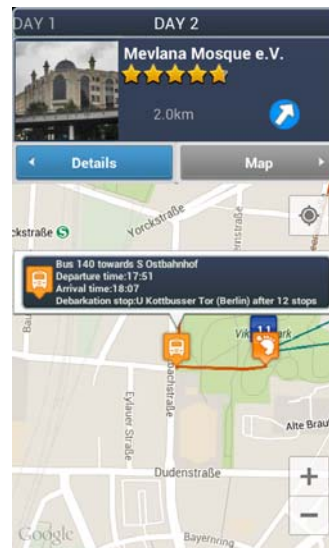
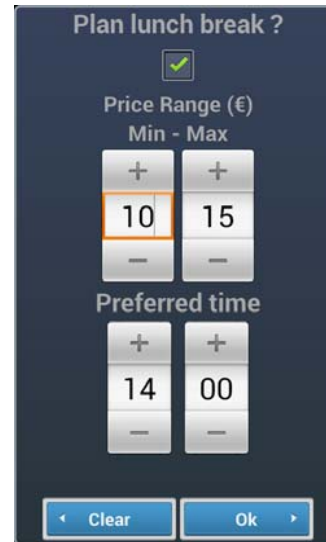
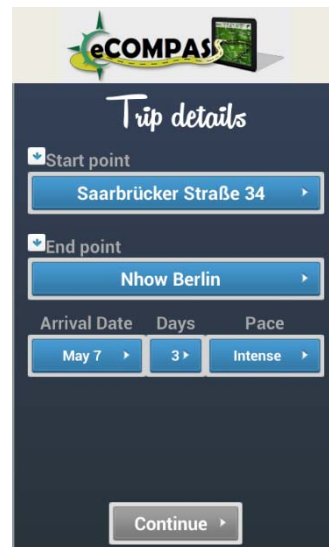
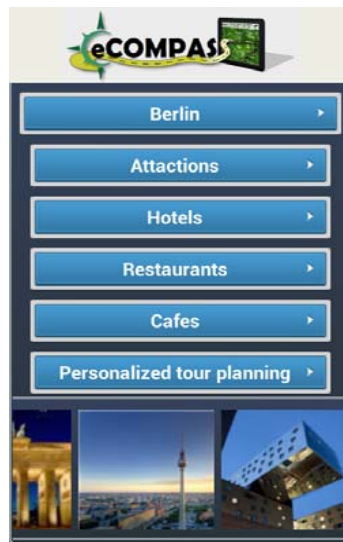


# Tourist-Trip Planning

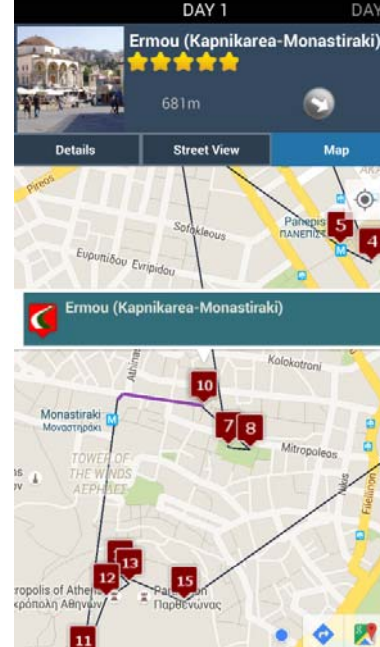
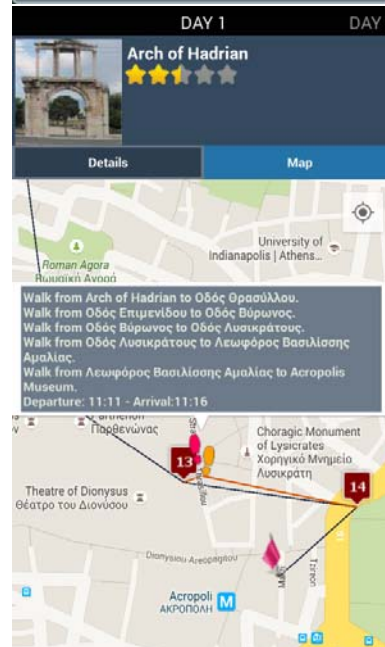
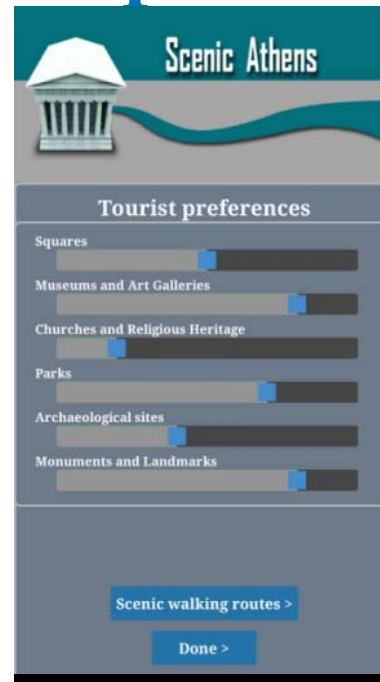
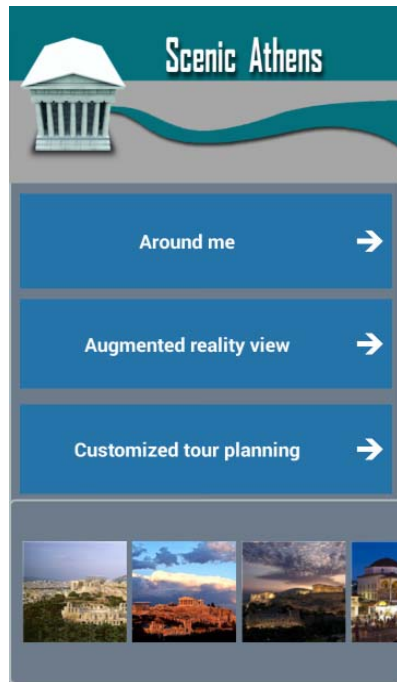
- Daily tourist tours, respecting tourists' constraints and POIs
- **Objective:** select POIs
  - maximizing tourist satisfaction
  - taking into account several parameters and constraints (distances among POIs, visiting time required for each POI, POIs opening days/hours, entrance fees, weather conditions, etc)
  - respecting the time available for sightseeing on a daily basis
  - planning breaks



# Tourist-Trip Planning



# Tourist-Trip Planning



# Future Plans

**MaaS (Mobility as a Service):**  
seamless mobility services

**Advanced IT support for MaaS**

- Towards enabling an automated Mass Market

*Mobility as a Service enables new market approach*

