Between June and August George Papadakis, Kerstin Bischoff, and Ernesto Diaz successfully completed their PhD studies. Within the area of Web Science the researchers investigated in detail the following topics:

- **Blocking techniques for efficient Entity Resolution over large, highly heterogeneous information spaces (George Papadakis)**

- **Living Analytics Methods for the Social Web (Ernesto Diaz)**

The collective effervescence of social media production has been enjoying a great deal of success in recent years. The hundred of millions of users who are actively participating in the 'Social Web' are exposed to ever-growing amounts of sites, relationships, and information.

This work contributes state-of-the-art methods and techniques to the emerging field of ‘Living Analytics’, whose main goal is to capture people interactions in real-time and to analyze these data in order to relieve information overload. We introduce intelligent filtering approaches that exploit social interactions, multidimensional relationships, metadata, and other data becoming ubiquitous in the social web, in order to discover and recommend the most relevant and attractive information that meets users' individual needs.

In particular, the contributions of this work fall into mainly two categories:

(i) **Recommender Systems**: We present novel algorithms that advance the state-of-the-art in Online Collaborative Filtering. Moreover, we propose an approach based on Swarm Intelligence to directly optimize ranking functions for item recommendations. New approaches to address the cold-start problem in social recommender systems are also part of our contributions. In addition, we also offer a personalized ranking algorithm for Epidemic Intelligence.

(ii) **Collective Intelligence**: Our contributions in the field of computational social science are twofold. First, we explore how social media streams can be exploited for Epidemic Intelligence and show its potential for early warning detection and outbreak analysis and control. Second, we show how the real-time nature of social media streams can be leveraged to take the pulse of political emotions.

In total, the methods and studies included in this work constitute an 'analytics toolbox' to help understand and analyze the social web.

**Keywords**: Machine Learning; Collaborative Filtering; Social Media.

- **Social Search in Collaborative Tagging Networks: The Role of Ties (Kerstin Bischoff)**

It has been argued that the different kinds of ties people form with each other hold different potentials for information exchange and collaboration. In this work we study social online ties in collaborative tagging systems - a prerequisite for social search in and built upon such systems. First, we focus on social tags as means for enhancing search even without explicitly given social connections: through better user profiling, richer resource descriptions, newly mined knowledge, or the recommendation of people with similar interests. In order to prove that tags are indeed a useful source of additional information, we analyze tag usage patterns in diverse tagging systems and discuss the implications for user profiling, search, and recommendation. Building upon the found characteristics we present approaches exploiting tags to enrich resources or user profiles with additional information – music moods and themes.

Second, we examine existing friendship links in Last.fm contrasting online and “real-
world” friends having coattended events. We investigate in depth similarity along such social links regarding demographics, network structure as well as taste in particular. We are developing machine learning methods that successfully identify online and off-line friends of different strength automatically. Additional experiments on weak and strong ties in Wikipedia show that also the prediction of future behavior, here co-editing of articles, can benefit from considering social ties.

Three successful PhD graduations