# Aditya Sundarrajan

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## Research Interests

Green computing, energy efficiency, Internet-scale distributed systems, networking, content delivery networks

## Education

**Ph.D. in Computer Science**, September 2013 – Present
University of Massachusetts Amherst
**GPA:** 3.8/4.0
**Advisor:** Prof. Ramesh Sitaraman

**M.S. in Electrical and Computer Engineering**, August 2010 – August 2013
University of Arizona
**GPA:** 4.0/4.0
**Thesis:** Fast rerouting from single link and single node failures for IP multicast
**Advisor:** Prof. Srinivasan Ramasubramanian

**B.E. in Electronics and Communication Engineering**, August 2006 – May 2010
SSN College of Engineering, Anna University
**GPA:** 84%
**Thesis:** Effective routing protocol for MPEG-4 video transmission in multi-hop MANETs
**Advisor:** Prof. M. Ramakrishnan

## Research Experience

**Research Assistant**, College of Information and Computer Sciences, University of Massachusetts Amherst, September 2013 – Present
**Advisor:** Prof. Ramesh Sitaraman
**Projects:**

- **Cache optimization for content delivery**
  - Designing algorithms to partition cache capacity in content delivery networks to maximize cache hit rate
  - Load balancing object placement to jointly maximize cache hit rate and minimize server load
- **Energy-efficient content caches using SSDs and HDDs**
  - Designing object placement algorithms that optimize the use of SSDs in a hybrid (solid state drive+spinning disk) server
  - Evaluating the feasibility of using hybrid servers to obtain large scale storage and improved end-user performance in an energy-efficient manner
- **Disk shutdown to reduce energy consumption and cost in Internet-scale systems**
  - Developing algorithms to shutdown disks and place content on edge servers in content delivery networks to conserve energy without impacting cache hit rates
  - Simulating the above algorithms in a custom-built disk simulator to measure cache hit rates and energy savings

**Research Assistant**, Networking research lab, University of Arizona, January 2011 – August 2013
**Advisor:** Prof. Srinivasan Ramasubramanian
**Projects:**

- **Fast rerouting from single link and single node failures for IP multicast**
  - Developed a fast rerouting algorithm using Steiner trees to recover from node failures immediately
  - Integrated the above proposal with existing unicast link rerouting mechanisms to provide protocol independent single link and single node fast rerouting

**Undergraduate Research Assistant**, SSN College of Engineering, September 2009 – April 2010
**Advisor:** Prof. M. Ramakrishnan
**Projects:**

- **Energy efficient routing protocol for MPEG-4 video transmission in multi-hop mobile ad hoc networks**
  - Analyzed the performance of existing routing protocols to transmit video traffic over MANETs using real video traces
  - Identified the most efficient protocol to transmit video, and proposed extensions to improve throughput

## Work Experience

**Systems Software Engineering Intern**, Akamai Technologies, Summers 2014, 2015
**Project:**

- **Multi copy object store for optimizing hybrid edge servers**
  - Analyzed the performance of current object placement policies in hybrid servers
  - Developed popularity based object placement and replication policies that maximize the disk utilization of hybrid servers in CDNs
- **Case for turning off disks in CDN edge servers**
  - Developed algorithms to turn off disks and place content on edge servers in a content delivery network to conserve energy without impacting cache hit rates
  - Developed a region wide disk simulator that implements the above algorithms and measures the cache hit rates and energy consumption with and without disk turnoff

## Publications

- Aditya Sundarrajan, Mangesh Kasbekar and Ramesh K. Sitaraman "Energy-efficient disk caching for content delivery", ACM e-Energy 2016.
- Aditya Sundarrajan and Srinivasan Ramasubramanian, "Fast reroute from single link and single node failures for IP multicast", in Computer Networks: The International Journal of Computer and Telecommunications Networking, Volume 82 Issue C, May 2015.
- Aditya Sundarrajan and Srinivasan Ramasubramanian, "Fast rerouting for IP multicast under single node failures", IEEE GLOBECOM 2013.