

## List of Dissertation Abstract (Information Media and Environment Sciences)

Name	Supervisor	Title	Abstract
Gen KAWATANI	Atsuhiro NAKAMOTO	Graph representation of partially ordered sets	In this thesis, we consider the k-upper bound graph of a poset $P=(X, \leq)$ , which is the simple undirected graph $G$ with $V(G)=X$ and $uv \in E(G)$ if and only if $u$ and $v$ have $k$ common upper bounds in $P$ . Generally, a $k$ -upper bound graph has some isolated vertices, and hence we consider the following problem. Given a graph $G$ , what is the minimum number of isolated vertices added to make $G$ a $k$ -upper bound graph? For this problem, we obtain an upper bound of the number.
Tomoki SAKA	Toshiyuki GOTOH	Blood Flow Contribution Analysis for Pulmonary Artery and Aorta using Sequential Contrast Enhanced MR Images	The pulmonary blood flow system consists of pulmonary arterial perfusion and aorta perfusion. Because the aorta perfusion is less than 10% of the pulmonary arterial one, the influence has been excluded by fitting $\gamma$ function. In this study, we suggest the numerical analysis method that, by modeling impulse response of a 2 inputs system, separate and evaluate 2 systems.
Ken SHIMAZAKI	Tomoharu NAGAO	A Study on Evolutionary Image Segmentation	Image segmentation is an image processing method that segments an input image into some regions whose characteristics are similar to themselves. Recently, the method of Semantic Segmentation which executes image segmentation and object recognition simultaneously has been studied. In this study, we propose an automatic construction method of the process for desired segmented image and recognized regions using evolutionary computation algorithm. Evolutionary computation enables to design the structure of function and formula such as similar function and calculation for input feature from image flexibly.
Rui TANABE	Tsutomu MATSUMOTO	A Study on Malware Detection and Disinfection Based on Dynamic Analysis	Recently, continuous and persistent cyber-attacks that target specific organizations are increasing (Targeted attack). At targeted attack, a highly functionalized malicious program (Malware) plays a great role and therefore countermeasures against malware are required. When thinking of malware countermeasures, it is important to understand their behavior. Malware dynamic analysis, in which malware samples are executed in a testing environment (Sandbox), has been widely used. In this dissertation, we propose malware countermeasure based on dynamic analysis.
Yuki KAWASAWAKI	Atsuhiro NAKAMOTO	Transformations in graphs on surfaces preserving specified properties	We research transformations in graphs. Especially, we deal with a local transformation, called an N-flip, in even triangulations on surfaces. A lot of researchers had considered whether two even triangulations can be transformed into each other by N-flips. In the thesis, we consider whether the transformation can preserve the specified properties of graphs, for example, the chromatic number or the connectivity.

Daisuke MAKITA	Tsutomu MATSUMOTO	A Study on Observation of DRDoS Attacks for Proactive Countermeasure and Real- time Response	In this paper, we propose observation systems of DRDoS attacks -- a cyberattack which has recently become a major threat on the Internet -- and analyze the observational results. In addition, we propose methods for proactive countermeasure and real-time response against the attacks and discuss the efficiency.
Naoki Yoshida	Hanako JOUHOU	A Study on Clone Resistance and Tamper Resistance	The system consists of input, process and output. If an attacker operates output, there are two system attack methods that cheat input and tamper process. We proposed nano artifact-metrics for improving clone resistance against input attack and self-modifying-based tamper resistant software improving tamper resistance against process attack.
Naoya Torii	Tsutomu Matsumoto	Security Evaluation of Physical True Random Number Generator and Physical Unclonable Function (PUF) using Latches	For secure key generation and storage for message encryption and the authentication in IoT devices, a latch-based physical true random numbers generator and a latch-based physical unclonable function (PUF) are fabricated in CMOS ASIC. They are small circuit sizes and low power consumptions and show high performances when the supply voltage and the temperature change within the rated values. In addition, it is presumed that the PUF has a tolerance by invasive attack experiments using FIB.
Huhe HAN	Takashi NISHIMURA	Study on Wulff shapes and their duals	<p>The Wulff shape, which was firstly introduced by G. Wulff, is known as a geometric model of a crystal at equilibrium. In this thesis, we introduce a new method (spherical method) to study Wulff shape. The main results of this thesis as followings.</p> <ol style="list-style-type: none"> <li>1. Spherical dual transform is an isometry with respect to the Pompeiu-Hausdorff metric.</li> <li>2. A Wulff shape is self-dual if and only if the spherical convex body induced by it is of constant width of <math>\pi/2</math>.</li> <li>3. A Wulff shape is strictly convex if and only if its convex integrand is of class <math>C^1</math>.</li> <li>4. The set consisting of stable convex integrands is dense in the set of <math>C^\infty</math> convex integrands.</li> </ol>