Strategiskt rådsmöte 4 2018
2018-05-03 kl. 10:00
Sammanträdesrum, Freja
Teknikringen 8

KTH Teknikvetenskap

Protokoll

Närvarande: Anna Delin, Sören Östlund, Sofia Nyström, Fredrik Viklund, Björn Önfelt, Lisa Johnsson (ersätter Anna-Karin Burström), Anna Wahl, Kristina Edström

1. **Mötets öppnande**

   Ordförande Anna Delin förklarar mötet öppnat.

2. **Anmälda förhinder**

   Stefan Hallström, Leif Kari och Anna-Karin Burström har anmält förhinder

3. **Val av justeringsperson**

   Kristina Edström utses till justeringsperson.

4. **Fastställande av föredragningslista [bilaga 1]**

   Föredragningslistan fastställs med tillägg att det inkom synpunkt på att omorganisationen på mekanikområdet borde ha tagits upp.

5. **Föregående protokoll (rådsmöte 5 mars 2018)**

   Protokollet från rådsmötet 5 mars har inte skickats ut. Detta görs så snart Anna-Karin är tillbaka.

6. **Anmälningar [bilaga 2]**

   Anna Delin redovisar aktuella disputationer och licentiatseminarier enligt bilaga 2.

7. Rekryteringsärenden, fakultetsförnyelse och jämställdhet

a. Rapport av pågående ärenden [bilaga 3]

Anna Delin föredrar aktuella rekryteringsärenden, befordringsärenden och docentprövningar.

b. Gästprofessor i matematik [bilaga 4]

Anna Delin föredrar ärendet. Strategiska rådet beslutar **att** tillstyrka ärendet.

c. Affilierad fakultet i Tillämpad fysik [bilaga 5]

Anna Delin föredrar ärendet. Strategiska rådet beslutar **att** tillstyrka ärendet.

d. Lektor i Marina System [bilaga 6]

Anna Delin föredrar ärendet. Strategiska rådet ger Anna Delin uppdraget att bearbeta ansökan tillsammans med Institutionen och att det därefter kan skickas in till beredningsmötet.

e. Biträdande lektor i Fordonssystemteknik [bilaga 7]

Anna Delin föredrar ärendet. Strategiska rådet ger Anna Delin uppdraget att bearbeta ansökan tillsammans med Institutionen och att det därefter kan skickas in till beredningsmötet.

f. Lektor i Matematik med inriktning mot modelldriven maskininlärning [bilaga 8]

Anna Delin föredrar ärendet. Strategiska rådet beslutar **att** tillstyrka ärendet.

8. Övriga frågor

Rådet undrar om det kommit någon mer information gällande STRUT rapporten.

Rådet diskuterar innehållet i mötena

Rådet diskuterar hantering av avtal

Rådet diskuterar anställning av interna kandidater och forskarutredningen

Anna-Karin uppdras att skicka ut en inbjudan för ett extrainsatt möte gällande omorganisationen.

Rådet önskar även få datum för höstens möten.

9. Mötets avslutande

Anna Delin förklarar mötet avslutat.

Vid protokollet

Lisa Johnsson

Justeras

Anna Delin

Kristina Edström

Föredragningslista

*= bilaga finns

1. Mötets öppnande
2. Anmälda förhinder
3. Val av justeringsperson
4. Fastställande av föredragningslista
5. Föregående protokoll (rådsmöte 5 mars 2018)
6. Anmälningar*
7. Rekryteringsärenden, fakultetsförnyelse och jämställdhet
    a. Rapport av pågående ärenden *
    b. Gästprofessor i Matematik
    c. Affilierad fakultet i Tillämpad fysik*
    d. Lektor i Marina system*
    e. Biträdande lektor i Fordonssystemteknik*
    f. Lektor i Matematik med inriktning mot modelldriven maskininlärning*
8. Övriga frågor

    Sätta datum för vårens sista möte.
9. Mötets avslutande

KTH, SE-100 44 Stockholm. Tel: 08-790 7602
E-post:akbu@kth.se www.kth.se/sci

Licentiatseminarium

6 mars - 9 april

14
mars
Initiation of rolling contact fatigue from asperities in elastohydrodynamic lubricated contacts
Hållfasthetslära
Licentiand: Carl-Magnus Everitt, Hållfasthetslära

16
mars
Lefschetz Properties of Monomial Ideals
Matematik
Licentiand: Nasrin Altafi Razlighi, Matematik

9
april
On Evaluation of Working Conditions aboard High-Performance Marine Craft
Farkostteknik
Licentiand: Pahansen de Alwis, Farkost och Flyg

Disputation

6 mars- 9 april

9
mars
Beam-to-Beam Contact and Its Application to Micromechanical Simulation of Fiber Networks
Hållfasthetslära
Plats: F3, Lindstedtsvägen 26, KTH, Stockholm
Respondent: Hamid Reza Motamedian, Hållfasthetslära

9
mars
Numerical study of dynamics of mass-emitting particles in multi-phase flow
Teknisk mekanik
Respondent: Zeinab Moradi Nour, Mekanik

6
april
High-Aspect Ratio Nanofabrication for Hard X-ray Zone Plates
Fysik - Biologisk och Biomedicinsk fysik
Plats: Sal FB53, AlbaNova Universitetscentrum, Roslagstullsbacken 21, Stockholm
Respondent: Karolis Parfeniukas, Tillämpad fysik

Namn HL	Ärendetyp	Namn på individ/ärende	Skola	Dnr	Status
Dilek	Befordran, lektor till professor	Berk Hess	SCI	VL-2017-0210	Sakkunniggranskning
Dilek	Befordran, lektor till professor	Jonas Weissenrieder	SCI	VL-2018-0002	Sakkunniggranskning
Katarina	Befordran, lektor till professor	Philipp Schlatter	SCI	VL-2017-0221	Sakkunniggranskning
Petra	Befordran, Bitr. lektor till lektor	Josefin Larsson	SCI	VL-2017-0196	Sakkunniggranskning
Katinka	Befordran, Bitr. lektor till lektor	Martin Månsson	SCI	VL-2017-0229	Sakkunniggranskning
Katarina	Befordran, Bitr. lektor till lektor	Carlos Casanueva	SCI	VL-2017-0185	BN möte 18/5
Petra	Befordran, Bitr. lektor till lektor	Sara Zahedi	SCI	VL-2017-0183	BN möte 9/5
Petra	Befordran, lektor till professor	Carlota Canalias	SCI	VL-2017-0184	AU - ärendet bordlagt 27/3, ny sakkunnig behöver utses. Info mailad skolan 3/4
Katarina	Bitr. lektor till lektor	Chong Qi	SCI	VL-2017-0188	Sakkunniggranskning
	Bitr. lektor till lektor	Patrick Henning	SCI	VL-2018-0053	Överlämnat till UF 24/4
Katarina	Affilierad fakultet	Michael Uhlin (förlängning)	SCI	VL-2018-0039	Allt klart, men avtal måste komma in
Katarina	Lektorat, utlyst	Lektor i matematisk statistik	SCI	VL-2017-0096	Ärendet skickat till skolan för beslut och referenstagning har genomförts på föreslagna kandidater
Kia	Biträdande lektor	Biträdande lektor i flygteknik	SCI	S-2016-1309	Mariani Raffaello och Evelyn Otero ska anställas.
Kia	Biträdande lektor	Biträdande lektor i tillämpad fysik m inr mot experimentell kvantfotonik	SCI	S-2018-0111	AU 10/4, väntar justerat AU protokoll
Kia	Lektor	Lektor i matematik	SCI	VL-2017-0009	Maria Gualdani och Karim Adiprasito ska anställas.

Docentärenden

Pågående ärenden	
Ilaria Testa	docentintervju ska planeras in
Kevin Schnelli	AU 27/2 hos sakkunnig
Walter Villanueva	hos sakkunnig
Ivan Stenius	hos sakkunnig
Lilian Mathiesen	Överlämnades till UF 19 feb
Martin Månsson	Väntar på skolans brev och förslag på sakkunnig
Sara Zahedi	Överlämnades till UF 19 feb Togs på AU 27/3
Lucie Delamotte	Väntar på skolans brev och förslag på sakkunnig
Jens Bardarson	Överlämnades till UF 12 mars togs på AU 27/3

Knut och Alice Wallenbergs Stiftelse

Stockholm i mars 2018

Rektor
KTH
100 44 Stockholm

KAW 2017.0411

I skrivelse av oktober 2017 till Knut och Alice Wallenbergs Stiftelse, professor Mats Boij anhållit om bidrag med 2 070 000 kronor för anställning av gästprofessor Gregory Smith, Queen's University, Kanada inom Stiftelsens program för utländska gästforskare inom matematik.

Stiftelsens styrelse har vid i dagarna hållet sammanträde bifallit framställningen med ett belopp om totalt 1 800 000 kronor för gästforskning. Särskilda villkor för anslaget följer i bilaga.

Enligt stiftelselagen är styrelsens ledamöter personligen ansvariga för att donerade medel utnyttjas för ändamål, som står i full överensstämmelse med ändamålsparagrafen i Stiftelsens stadgar. Medel enligt detta donationsbrev får därför endast utnyttjas för i donationsbrevet angivet ändamål. Administrativa avgifter eller påslag för ospecificerade ändamål kan således inte tillåtas belasta anslaget. Mottagandet av donationen är en bekräftelse på att dessa villkor accepteras av mottagande lärosäte.

Anslaget kommer att utbetalas till ett bankkonto tillhörande KTH och efter skriftlig rekvisition på blankett vilken finns att hämta på Stiftelsens hemsida http://kaw.wallenberg.org. Samtliga rekvisitioner skall följa Stiftelsens budgetuppställning och särskilda villkor, vilka specificeras i bilaga till detta donationsbrev, samt vara verifierade på lämpligt sätt. Ytterligare information avseende rekvisitioner återfinns på Stiftelsens hemsida. Inför den första rekvisitionen skall en lista över samtliga personer med attesträtt tillställas Stiftelsen. Listan skall vara undertecknad av huvudmannen.

Stiftelsen förbehåller sig rätten att, i efterhand, följa upp att utbetalda medel använts för det beviljade ändamålet.

Anslagsmedel som inte rekvirerats inom två år från beslutsdatum, kommer automatiskt att återföras till Stiftelsen.

Högaktningsfullt
KNUT OCH ALICE WALLENBERGS STIFTELSE

CC: Mats Boij (boij@kth.se)

SÄRSKILDA VILLKOR

Dnr KAW 2017.0411

"Nomination of foreign guest professors"

Budget

Av det beviljade beloppet 1 800 000 kronor får maximalt 230 000 kronor avsättas för indirekta kostnader och lokalkostnader.

En ny budget anpassad till det beviljade beloppet skall vara Stiftelsen tillhanda senast fyra veckor efter att anslagsmottagaren mottagit beslutsbrevet. Stiftelsen kommer att granska den förnyade budgeten och vid behov inleda en dialog med anslagsmottagaren.

I samband med inlämnandet av budgeten skall projektperioden anges.

Stiftelsens budgetmall skall användas, vilken återfinns på hemsidan http://kaw.wallenberg.org. Budgetfrågor ställs till Stiftelsens medarbetare Caroline Morton (cm@wfab.se).

Avskrivning av utrustning skall inledas senast 24 månader efter projektstart.

Rapportering

En vetenskaplig rapport skall tillställas Stiftelsen 24 månader efter projektstart. Stiftelsen kommer i normalfallet, med rapporten som underlag, att bjuda in anslagsmottagaren till en dialog om projektets vetenskapliga utveckling. Stiftelsens mall för vetenskaplig rapport skall användas.

En vetenskaplig och ekonomisk slutrapport skall tillställas Stiftelsen senast sex månader efter projektets slutförande. Stiftelsens mallar för vetenskaplig slutrapport och ekonomisk slutrapport skall utnyttjas.

PROJECT DESCRIPTION
GUEST PROFESSORSHIP IN ALGEBRAIC GEOMETRY FOR GREGORY G. SMITH

MATS BOIJ
Department of Mathematics
KTH

1. The Research Environment and Swedish Research

Algebraic geometry holds a prominent position in contemporary mathematics and has numerous connections with fields such as complex analysis, topology, mathematical physics, and number theory. Initially the study of solutions to systems of multivariate polynomial equations, algebraic geometry is now one of the deepest areas in all of mathematics, both conceptually and in terms of techniques. Modern research in this subject area emphasizes intrinsic geometric properties, families of objects explicitly depending on parameters, and an expanding range of applications. Internationally, algebraic geometry is the second largest field in pure mathematics, after partial differential equations, as measured by the number of publications according to the Mathematics Subject Classification (MSC) codes. However, in Sweden, it has been a comparatively small field.

Algebra and Geometry Research Group. The research group in algebraic geometry at KTH covers a wide spectrum of research interests and enjoys a large number of international collaborations. Professors from universities outside Sweden have spending their sabbaticals with our group and we have trained several postdoctoral scholars supported by the Göran Gustafsson Foundation and by the Knut and Alice Wallenberg Foundation. The group has grown from a single professor and one PhD student in the early 1990s into the substantial and very active group we have today. The groups has also produced several exceptional PhD students including Jonas Bergström (SU), Dan Petersen (Copenhagen), and Jonas Söderberg (SEK).

- **Professor Mats Boij** works in the boundary between algebraic geometry and commutative algebra. His work, with his former PhD student Jonas Söderberg, on Betti diagrams of modules has drawn much attention and created a new area, called *Boij–Söderberg theory*. Another important facet of his work involves the study of the weak Lefschetz property of Gorenstein algebras in collaboration with Juan Migliore, Rosa Maria Miró-Roig, Uwe Nagel and Fabrizio Zanello. In 2009, he was awarded the *Wallenberg Prize* from the Swedish Mathematical Society.
- **Professor Sandra Di Rocco** works in projective algebraic geometry with particular emphasis on combinatorial structures and numerical methods. Her current research develops convex criteria for assessing positivity of toric vector bundles and estimates of invariants of line arrangements.

Date: 2017–10–04.

Her work on numerical algorithms computes invariants of algebraic varieties and, more recently, involves sampling and data-clouds on complex and real algebraic varieties.

- **Associate Professor David Rydh** works on fundamental problems in the theory of algebraic stacks. His research is currently focused in two directions: derived categories of stacks, and the birational geometry of Deligne–Mumford stacks with connections to wild ramification, resolution of singularities and toric geometry. Recent highlights include a local description of algebraic stacks (Alper's conjecture), a description of smashing ideals for stacks (the telescope conjecture), and the weak factorization theorem for stacks. Since receiving his PhD in 2008, he has been a postdoctoral fellow at UC Berkeley and was recruited to KTH with support from KAW. David Rydh was awarded the *Wallenberg Prize* from the Swedish Mathematical Society in 2015 and the *Göran Gustafsson Prize for young researchers* in 2017.
- **Associate Professor Roy Skjelnes** works with Hilbert and Quot schemes and, in particular, with the moduli of zero dimensional objects. This research field relies on techniques in commutative algebra, but is motivated by questions come from geometry. Together with his co-authors, Roy Skjelnes has made several important contributions such as describing the Hilbert scheme of points on local rings (where several misconceptions within the community were clarified), characterizing the principal component of the Hilbert scheme (where a general blow-construction was given), and proving of the localization conjecture for Hasse–Schmidt derivations. His latest research is about explicit projective embeddings of certain moduli schemes, and Weil restrictions for modules and their connections to non-commutative algebra.
- **International Collaborations** The following mathematicians from universities outside Sweden have joint publications with members of the algebra and geometry group at KTH:

  Jarod Alper, Thomas Bauer, Mauro C. Beltrametti, Gian Mario Besana, Cristiano Bocci, Enrico Carlini, Cinzia Casagrande, Eduardo H. Cattani, Aldo Conca, Susan Cooper, María Angélica Cueto, Alicia M. Dickenstein, Jan Draisma, Marcin Dumnicki, Dan Edidin, Gunnar Fløystad, Anthony V. Geramita, Trond Stølen Gustavsen, Christian Haase, Jack Hall, Brian Harbourne, Jonathan D. Hauenstein, Evelyne Hubert, June Huh, Jack Huizenga, Anthony A. Iarrobino, Kelly Jabbusch, Michal Kapustka, Andreas Leopold Knutsen, Alex Küronya, Antonio Lanteri, Laura Marie Costa, Juan Carlos Migliore, Rick Miranda, Rosa María Miró-Roig, Uwe Nagel, Benjamin Nill, Andreas Paffenholz, Christopher S. Peterson, Ragni Piene, Yves Pitteloud, Piotr Pokora, Kristian Ranestad, Joaquim Roé, Henry K. Schenck, Josef Schicho, Gregory G. Smith, Andrew John Sommese, Bernd Sturmfels, Wioletta Syzdek, Tomasz Szemberg, Zachariah C. Teitler, Anders Thorup, Filippo Viviani, Charles H. Walter, Charles W. Wampler, Fabrizio Zanello.

  During the past years, the algebra and geometry groups has trained a number of postdoctoral scholars, primarily supported through the Göran Gustafsson Fellowship program and the Knut and Alice Wallenberg Foundation, including the following people:

  Stephanie Yang, Fabrizio Zanello, Kelly Jabbush, Jack Hall, Joachim Koch, Nicola Pagani, Ralph Morrison, Alessandro De Stefani.

2. The value of Appointing Gregory G. Smith

Professor Gregory G. Smith is an algebraic geometer, with special interest in the combinatorial and computational aspects of the field. He is an internationally recognized researcher and acknowledged leader in toric geometry, the study of Hilbert schemes, and computational algebraic geometry (especially *Macaulay2*). His proposed year-long visit to KTH will lead to top quality research publications with both new and old Swedish collaborators. His appointment as a guest researcher will also enhance the training of graduate students and postdoctoral fellows.

The predicted impact is based, in part, on past experience. During the 2009–2010 academic year, Professor Gregory G. Smith visited the Algebra and Geometry group at KTH as part of a sabbatical from Queen's University. This period was very successful, leading to joint publications with Mats Boij and Sandra Di Rocco. He was also greatly involved in the seminar activities (speaking in the algebraic geometry seminar, combinatorics seminar, departmental colloquium, 'great papers' seminar, the high school math circle, and math teachers seminar) and he had influential contact with several PhD students and postdoctoral fellows (including David Eklund, Katharina Heinrich, Kelly Jabbush, Christine Jost, and Stephanie Yang).

The joint project with Mats Boij [4] studies cones of Hilbert functions in the spirit of Boij–Söderberg theory. In several important cases, it completely describes these cones both in terms of bounding hyperplanes and in terms of extreme rays. The ultimate goal for this project is to understand multigraded settings and, in particular, the gradings coming from toric geometry.

The joint project with Sandra Di Rocco and Kelly Jabbush [5] introduces a collection of convex polytopes associated to a toric vector bundle on a smooth complete toric variety. By means of these collections, they are able to answer questions about global generation and ampleness. However, this new dictionary between algebraic and convex geometry is still in its infancy.

Beyond the projects directly linked to the earlier collaborations, there are several new interesting areas of research to be explored. These include the study of positive polynomials and sums of squares, building on recent work with Gregoriy Blekherman and Mauricio Velasco [2, 3], and new connections between matroids and Hodge-Riemann relations, advancing ongoing conversations between Mats Boij, June Huh, and Allen Knutsen.

3. Research Plan (written by Gregory G. Smith)

My research centers around "combinatorial varieties", namely those algebraic schemes, spaces, or stacks for which the defining equations, the cohomology, or other geometric structures have a concrete combinatorial description. By design, combinatorial varieties are the fundamental objects at the interface between algebra, combinatorics, and geometry. Toric varieties and Schubert varieties are the most prominent members of this class. However, many other spaces, such as the moduli space of curves and Hilbert schemes, also belong within this conceptual framework. Despite being rare among all spaces (under some metrics), combinatorial varieties account for a disproportionally large number of the geometric objects arising in commutative algebra, mathematical physics, optimization, and representation theory. In addition, their explicit nature makes them an exceptionally good testing-ground for general theories and conjectures within algebraic

geometry. This combination means that advances in our understanding of combinatorial varieties tend to impact and influence a large community. My overarching goals are to expand the class of combinatorial varieties and to deepen our knowledge about specific members of this class.

Nonnegativity, Sums of Squares, and Convexity. The properties of algebraic schemes defined over a real numbers $\mathbb{R}$ (or, more generally, a real closed field) are dramatically different than those defined over the complex numbers $\mathbb{C}$ (or an algebraically closed field). For instance, an real algebraic variety can have several connected components in the Euclidean topology, a finite number of polynomials defining a real algebraic set can be replaced by a single polynomial (the sum of squares of the original polynomials), and many classical constructions, such as projective space, Grassmannians, and blow-ups, can be made without leaving the affine setting. Despite these intrinsic differences, recent developments reveal an unexpectedly tight connection between real and complex algebraic geometry.

As a prototype of this emerging relationship, my first article [2] with Grigoriy Blekherman (Georgia Tech) and Mauricio Velasco (Universidad de los Andes) gives a vast generalization of Hilbert's 1888 classification of nonnegative forms. We prove that every real quadratic form that is nonnegative on a real nondegenerate subvariety $X \subseteq \mathbb{P}^n$ is a sum of squares of linear forms if and only if X is a variety of minimal degree, that is $\deg(X) = 1 + \operatorname{codim}(X)$. Combined with the celebrated catalogue for varieties of minimal degree, this leads to a complete list of varieties on which every nonnegative form is a sums of squares. In our second paper [3], we focus on certificates of nonnegativity. Given a real projective curve with homogeneous coordinate ring R and a nonnegative homogeneous element $f \in R$, we bound the degree of a nonzero homogeneous sum-of-squares $g \in R$ such that the product fg is again a sum of squares. Better yet, our degree bounds only depend on geometric invariants of the curve and we show that there exists smooth curves for which our bounds are sharp. Prior to this work, optimal degree bounds were only known for special collections of points.

We plan to pursue this broad theme. In the short-term, we expect to characterize real projective varieties of almost minimal degree in terms of the nonnegative elements in their homogeneous coordinate ring. More ambitiously, we want to construct rational surfaces (and higher-dimensional varieties) with a relatively large number of real singularities. Having a nonnegative element vanish at a relatively large number of real singularities prevents it from having a low-degree sum-of-squares multiplier. To effectively exploit this idea, one needs fine control over the real singularities.

Hilbert Schemes and Combinatorial Commutative Algebra. As the quintessential parameter spaces in algebraic geometry, the points in a Hilbert scheme correspond to the closed subschemes in a fixed ambient projective scheme. Hilbert schemes play an indispensable role in constructing and compactifying other moduli spaces, and are, in themselves, a rich source of higher-dimensional varieties. Nevertheless, the geometric properties of a typical Hilbert schemes are surprisingly poorly understood.

Andrew Staal (Higher School of Economics), as part of his PhD recent thesis completed under my supervision, exhibits a large number (more than half in one measure) of Hilbert schemes parametrizing closed subschemes of $\mathbb{P}^n$ that are smooth and irreducible. Given that every singularity

type appears on a Hilbert scheme parametrizing surfaces in $\mathbb{P}^4$ and the number of irreducible components of Hilbert schemes parametrizing curves in $\mathbb{P}^3$ cannot be bounded by a polynomial in the degree and genus, this result was unexpected. These special Hilbert schemes seem to behave like generalized Grassmannians. By analyzing the weight of unique Borel-fixed point on such a Hilbert scheme, we anticipate being able to describe the cohomology of line bundles. In other words, this would be a analogue of the Borel–Weil–Bott Theorem. Can we understand the Chow ring of these spaces and develop a variant of Schubert calculus? We hope to investigate these ideas in collaboration with Roy Skjelnes (KTH).

In an independent direction, we also plan to study the Hilbert schemes parametrizing closed subschemes of a smooth projective toric variety with a fixed multigraded Hilbert polynomial. Although [6] establishes the existence of these multigraded Hilbert schemes, embarrassingly little is known about their geometry. As a first step, Mats Boij (KTH) and I envision characterizing the multigraded Hilbert polynomials associated to non-empty Hilbert schemes. To accomplish this, we must avoid lex-segment ideals and exploit the ideas from [4]. However, our techniques should still distinguish points corresponding to monomial ideals in the Cox ring of the ambient toric variety. In some preliminary examples, the combinatorial structure of these monomial ideals allows one to construct irreducible rational curves through the correspond points. Can we identify the connected-components in these multigraded Hilbert schemes?

Toric Vector Bundles and Convex Polytopes. A toric variety is a special type of algebraic space. Parametrized by monomials, toric varieties arises in essentially all areas of applied algebraic geometry, including algebraic statistics, chemical reaction networks, geometric modelling, and mirror symmetry. Their significance and ubiquity comes, in part, from their calculability and close relation to polyhedral objects. However, the class of toric varieties is too small. It is not closed under some important geometric operations and precludes many interesting phenomena. The basic challenge is to enlarge the class of varieties while retaining the favourable features.

To address this challenge, we focus on certain vector bundles over a smooth projective toric variety X. More precisely, a toric vector bundle is a torus-equivariant locally-free $\mathscr{O}_X$-module $\mathscr{E}$ of finite rank. The associated projective variety $\mathbb{P}(\mathscr{E})$ is a toric variety if and only if $\mathscr{E}$ splits into a direct sum of line bundles. In [5], Sandra Di Rocco (KTH), Kelly Jabbusch (University of Michigan, Dearborn) and I associate a collection of convex polytopes, called the ***parliament of polytopes***, to the toric vector bundle $\mathscr{E}$. Our broad aim is to create a comprehensive dictionary between the geometry of toric vector bundles and properties of the parliament of polytopes. As first entry in this new dictionary, [5] shows that the lattice points contained in these polytopes correspond to generators for the space $H^0(X,\mathscr{E})$ of global sections. As a consequence, we obtain polyhedral criteria for deciding if a toric vector bundle is globally generated or very ample. These criteria highlight the key difference between toric vector bundles of higher rank and line bundles: toric vector bundles depend on both the combinatorics of the polytope and the matroid properties of the vectors indexing the polytopes.

Continuing our collaboration, we already conjecture that $\mathscr{E}$ is big if and only if some Minkowski sum of the polytopes in the parliament is full-dimensional. More ambitiously, given an ample toric vector bundle $\mathscr{E}$, we are looking for effective polyhedral bounds on $m \in \mathbb{N}$ such that $\mathrm{Sym}^m(\mathscr{E})$ is

globally generated or very ample. Sharp bounds on m would settle Fujita's conjecture in this setting. Expanding this dictionary, we also expect to create an Ehrhart theory for parliaments of polytopes. The Hilbert polynomial for $\mathbb{P}(\mathscr{E} \otimes \mathscr{L})$, where $\mathscr{L}$ is a line bundle on X and $\mathscr{E} \otimes \mathscr{L}$ is ample, should be a signed-count of appropriate collections of lattice points. Such a combinatorial reinterpretation will yield new insights into the higher-cohomology of toric vector bundles and, hopefully, provide new effective vanishing theorems. We suspect that there are relatively straightforward topological hypothesis on the parliament of polytopes which imply that all of the higher-cohomology groups of the associated toric vector bundle vanish. If true, then this would resolve long-standing conjectures about the syzygies of smooth projective toric varieties.

Combinatorics and the Hodge–Riemann relations. In the their ground-breaking work [0, 1], Karim Adiprasito (Hebrew University), June Huh (Institute for Advanced Study) and Eric Katz (Ohio State) associate to any matroid a commutative ring that satisfies the Hodge–Riemann relations. As a consequence, they are able to resolve long-standing conjectures in combinatorics. Inspired by this work, Mats Boij (KTH), June Huh (IAS), Allen Knutsen (Cornell) and I have generated a new family of combinatorial rings that also satisfy the Hodge–Riemann relations. Our preliminary construction centers around functions on Grassmannians over finite fields, but we expect this to be a more general phenomena likely fitting within tropical algebraic geometry. At the most optimistic end of the spectrum, plausible applications of this line of reasoning could even include counterexamples to the Hodge conjecture.

References

[0] Karim Adiprasito, June Huh, and Eric Katz, *Hodge theory of matroids*, Notices Amer. Math. Soc. **64** (2017), no. 1, 26–30.

[1] ———, *Hodge Theory for Combinatorial Geometries*, `arXiv:1511.02888 [math.CO]`.

[2] Grigoriy Blekherman, Gregory G. Smith, and Mauricio Velasco, *Sums of squares and varieties of minimal degree*, Journal of the American Mathematical Society [JAMS] **29** (2016), 893–913.

[3] ———, *Sharp degree bounds for sum-of-squares certificates on projective curves*, `arXiv:1605.08330 [math.AG]`.

[4] Mats Boij and Gregory G. Smith, *Cones of Hilbert functions*, International Mathematics Research Notices [IMRN] (2015), 10314–10338.

[5] Sandra Di Rocco, Kelly Jabbusch, and Gregory G. Smith, *Toric vector bundles and parliaments of polytopes*, Transactions of the American Mathematical Society [TAMS] (to appear), `DOI:10.1090/tran/7201`.

[6] Diane Maclagan and Gregory G. Smith, *Uniform bounds on multigraded regularity*, Journal of Algebraic Geometry **14** (2005), 137–164.

GREGORY G. SMITH

Curriculum Vitæ

4 October 2017

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Education

2001 PhD in Mathematics, University of California, Berkeley, CA
1997 MA in Mathematics, Brandeis University, Waltham, MA
1995 BScH in Mathematics, Queen's University, Kingston, ON

Professional Experience

2013– Professor, Queen's University, Kingston, ON
Fall 2016 General Member, Fields Institute, Toronto, ON
2007–2013 Associate Professor, Queen's University, Kingston, ON
Spring 2013 Research Professor, Mathematical Sciences Research Institute (MSRI), Berkeley, CA
2009–2010 Visiting Professor, Royal Institute of Technology (KTH), Stockholm, SWEDEN
Spring 2009 General member, MSRI, Berkeley, CA
2004–2007 Assistant Professor, Queen's University, Kingston, ON
2001–2004 Assistant Professor, Barnard College, Columbia University, New York, NY
Spring 2003 Postdoctoral Fellow, MSRI, Berkeley, CA

Selected Awards and Grants

2005–2020 Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grants
2012 Coxeter–James Prize from the Canadian Mathematical Society (CMS)
2007 André–Aisenstadt Prize from Centre de Recherches Mathématiques (CRM)
2001 Clay Mathematics Institute Liftoff Mathematician
2001 Mathematical Association of America (MAA) Project NExT Fellow

Research Interests

Algebraic Geometry, Commutative Algebra, and Computational Algebra

Refereed Publications

Authors are listed alphabetically and contributed equally.

[18] Sandra Di Rocco, Kelly Jabbusch, and Gregory G. Smith, Toric vector bundles and parliaments of polytopes, to appear in *Transactions of the American Mathematical Society*, available at DOI:10.1090/tran/7201

[17] Grigoriy Blekherman, Gregory G. Smith, and Mauricio Velasco, Sums of squares and varieties of minimal degree, *Journal of the American Mathematical Society* **29** (2016) 893–913

[16] Mats Boij and Gregory G. Smith, Cones of Hilbert functions, *International Mathematics Research Notices* (IMRN) **20** (2015) 10314–10338

[15] Adam McCabe and Gregory G. Smith, Log-concavity of asymptotic multigraded Hilbert Series, *Proceedings of the American Mathematical Society* **141** (2013) 1883–1892

[14] Jessica Sidman and Gregory G. Smith, Linear determinantal equations for all projective schemes, *Algebra & Number Theory* **5** (2011) 1041–1061

[13] Daniel Erman, Gregory G. Smith, and Anthony Várilly-Alvarado, Laurent Polynomials and Eulerian Numbers, *Journal of Combinatorial Theory, Series A* **118** (2011) 396–402

[12] Diane Maclagan and Gregory G. Smith, Smooth and irreducible multigraded Hilbert schemes, *Advances in Mathematics* **223** (2010) 1608–1631

[11] Alastair Craw and Gregory G. Smith, Projective toric varieties as fine moduli spaces of quiver representations, *American Journal of Mathematics* **130** (2008) 1509–1534

[10] Milena Hering, Hal Schenck, and Gregory G. Smith, Syzygies, multigraded regularity and toric varieties, *Compositio Mathematica* **142** (2006) 1499–1506.

[09] Lev A. Borisov, Linda Chen, and Gregory G. Smith, The orbifold Chow ring of a toric Deligne-Mumford stack, *Journal of the American Mathematical Society* **18** (2005) 193–215

[08] Diane Maclagan and Gregory G. Smith, Uniform bounds on multigraded regularity, *Journal of Algebraic Geometry* **14** (2005) 137–164

[07] Diane Maclagan and Gregory G. Smith, Multigraded Castelnuovo-Mumford Regularity, *Journal für die reine und angewandte Mathematik* (Crelle's Journal) **571** (2004) 179–212

[06] Serkan Hoşten and Gregory G. Smith, Monomial ideals, In *Computations in algebraic geometry with Macaulay2*, Algorithms and Computations in Mathematics 8, pp. 73–100, Springer-Verlag, New York, 2001

[05] Gregory G. Smith and Bernd Sturmfels, Teaching the geometry of schemes, In *Computations in algebraic geometry with Macaulay2*, Algorithms and Computations in Mathematics 8, pp. 55–70, Springer-Verlag, New York, 2001

[04] Gregory G. Smith, Irreducible components of characteristic varieties, *Journal of Pure and Applied Algebra* **165** (2001) 291–306

[03] Mircea Mustaţă, Gregory G. Smith, Harrison Tsai, and Uli Walther, $\mathscr{D}$-modules on smooth toric varieties, *Journal of Algebra* **240** (2001) 744–770

[02] Gregory G. Smith, Computing global extension modules, *Journal of Symbolic Computation* **29** (2000) 729–746

[01] H.E.A. Campbell, Anthony V. Geramita, Ian P. Hughes, Gregory G. Smith, and David L. Wehlau, Some remarks on Hilbert functions of Veronese algebras, *Communications in Algebra* **28** (2000) 1487–1496

Books Edited

[19] Gregory G. Smith and Bernd Sturmfels, *Combinatorial Algebraic Geometry, selected papers from the 2016 apprenticeship program*, Fields Institute Communications, Springer, New York, (to appear)

Preprints

[21] Christine Berkesch Zamaere, Daniel Erman, and Gregory G. Smith, Virtual resolutions for a product of projective spaces, `arXiv:1703.07631 [math.AC]`

[20] Grigoriy Blekherman, Gregory G. Smith, and Mauricio Velasco, Sharp degree bounds for sum-of-squares certificates on projective curves, `arXiv:1605.08330 [math.AG]`

Mathematical Software

[e] Gregory G. Smith and Mike Stillman *Complexes*, a package for computational homological algebra, 2016–2017

[d] Gregory G. Smith, *NormalToricVarieties*, a package for manipulating normal toric varieties, toric divisors, and coherent sheaves, 2009–2017

[c] Graham Denham and Gregory G. Smith, *HyperplaneArrangements*, a package for computing algebraic invariants of hyperplane arrangements, 2008–2011

[b] Sorin Popescu, Gregory G. Smith and Mike Stillman, *SimplicialComplexes*, a package for investigating simplicial complexes and the corresponding monomial ideals, 2006, 2010

[a] Gregory G. Smith, *FourierMotzkin*, a package for converting between the two basic representations of a convex cone, 1998–2000, 2006, 2008, 2010

All packages are open source and distributed with the *Macaulay2* software system.

Five Most Significant Research Contributions.

1. *Nonnegativity and sums-of-squares* [17]. Establishing tight connections between real and complex by capitalizing on combinatorial properties of spectrahedra is extremely innovative. Pursing the many consequences of these ideas is first part of the proposed research program.
2. *Toric Deligne–Mumford stacks* [09]. The introduction of toric Deligne–Mumfords stacks created the most accessible and applicable subcategory of algebraic stacks. This exceptionally well-cited paper continues to have a substantial impact on a broad community.
3. *Multigraded Castelnuovo–Mumford regularity* [07]. With the benefit of hindsight, it is clear that the multigraded variant of Castelnuovo–Mumford regularity developed in this paper has become the measure for complexity in multigraded commutative algebra and toric geometry. This fundamental invariant plays an important role in several subsequent papers including [14, 12, 11, 10, 08] and the second part of the proposed research program.
4. *Parliaments of polytopes* [18]. By demonstrating a close relationship between toric vector bundles and suitable collections of convex polytopes indexed by flats in a matroid, this work completely transforms the study of these equivariant vector bundles. The third part of the proposed research program explores the potentially groundbreaking applications.
5. *Computer algebra* [d]. Although it is challenging to quantify software usage, anecdotal evidence suggests that my contributions to the *Macaulay2* software system are attracting an increasing number of users. These research tools are particularly valuable for collecting heuristic evidence, establishing patterns, and exploring pathologies.

Invited Lecture Series

2014-06 *Macaulay2 summer school*, University of Illinois at Urbana–Champaign (UIUC), Urbana, IL; gave a five-hour mini-course on toric varieties

2007-05 *School: Algebraic Geometry and Algebraic Combinatorics*, CRM, Montreal, QC; gave a five-lecture mini-course on toric varieties

Invited Talks

2017-10-21 Canadian Western Algebraic Geometry Symposium, University of Alberta, Edmonton, AB

2017-08-03 Core algorithms in algebra and geometry, Society for Industrial and Applied Mathematics (SIAM) conference on applied algebraic geometry, Atlanta, GA

2017-07-29 Applied *Macaulay2* tutorials, Atlanta, GA

2017-07-27 Applied and computational algebra and geometry Session, Mathematical Congress of the Americas (MCA), Montreal, QC

2017-07-11 Computational algebraic geometry session, Foundations of Computational Mathematics (FoCM), Bareclona, SPAIN

2017-05-09 Beyond toric geometry workshop, Casa Matemática Oaxaca (CMO), Oaxaca, MEXICO

2017-03-24 Mathematics colloquium, University of Ottawa, Ottawa, ON

2017-03-09	Geometry and the Equations Defining Projective Varieties, University of Arkansas, Fayetteville, AR
2017-01-04	Gaussian graphical models and combinatorial commutative algebra session, Joint Mathematics Meetings (JMM), Atlanta, GA
2016-10-28	Mathematics colloquium, University of Nebraska, Lincoln, NE
2016-10-27	Commutative algebra seminar, University of Nebraska, Lincoln, NE
2016-08-18	Introductory workshop, Combinatorial Algebraic Geometry Program (CAG), Fields Institute, Toronto, ON
2016-08-16	Introductory Workshop, CAG, Fields Institute, Toronto, ON
2016-03-28	Toric geometry, Mathematisches Forschungsinstitut Oberwolfach (MFO), Oberwolfach, GERMANY
2016-01-24	Combinatorial algebra meets algebraic combinatorics, Western University, London, ON
2016-01-07	Commutative algebra session, JMM, Seattle, WA
2015-11-13	Mathematics colloquium, McMaster University, Hamilton, ON
2015-10-05	Mathematics colloquium, University of Waterloo, Waterloo, ON
2015-08-07	Combinatorial methods in algebraic geometry minisymposium, SIAM conference on applied algebraic geometry, Daejeon, SOUTH KOREA
2015-07-17	Commutative algebra and computational algebra geometry session, AMS Summer Institute in Algebraic Geometry, Salt Lake City, UT
2015-06-02	Minimal free resolutions workshop, International Centre for Mathematical Sciences, Edinburgh, SCOTLAND
2015-04-29	Algebra seminar, University of New Brunswick, Fredericton, NB
2015-04-28	Mathematics colloquium, University of New Brunswick, Fredericton, NB
2014-12-08	Commutative Algebra session, CMS meeting, Hamilton, ON
2014-11-19	Symbolic and numerical methods for tensors workshop, Simons Institute, Berkeley, CA
2014-11-11	Mathematics colloquium, Santa Clara University, Santa Clara, CA
2014-10-24	Algebra, geometry and cryptology seminar, Boise State University, Boise, ID
2014-10-23	Mathematics colloquium, Boise State University, Boise, ID
2014-09-27	Route 81 conference, Cornell University, Ithaca, NY
2014-09-20	New tends in toric varieties session, AMS meeting, Eau Claire, WI
2014-09-19	Mathematics colloquium, University of Wisconsin, Madison, WI
2014-09-19	Algebraic geometry seminar, University of Wisconsin, Madison, WI
2014-09-17	Mathematics colloquium, University of Notre Dame, South Bend, IN
2014-09-17	Algebraic geometry seminar, University of Notre Dame, South Bend, IN
2014-06-20	Macaulay2 conference, UIUC, Urbana, IL
2014-04-10	Mathematics colloquium, University of Minnesota, Minneapolis, MN
2014-02-20	Mathematics colloquium, Reed College, Portland, OR
2014-02-03	Positivity of linear series and vector bundles workshop, Banff International Research Station (BIRS), Banff, AB
2013-09-20	Mathematics colloquium, Queen's University, Kingston, ON
2013-08-09	Toric geometry and topology, MCA, Guanajuato, MEXICO
2013-07-12	Commutative algebra and its interaction with algebraic geometry, Centre International de Recontres Mathématiques (CIRM), Luminy, FRANCE

2013-07-03 Mathematisches kolloquium, Universität Osanbrück, Osnabrück, GERMANY
2013-05-14 Constructive homological algebra, MFO, Oberwolfach, GERMANY
2013-04-26 Representation theory seminar, University of California, Berkeley, CA
2013-04-17 Algebra-combinatorics seminar, San Francisco State University, San Francisco, CA
2013-04-14 Combinatorial/computational commutative algebra session, AMS meeting, Boulder, CO
2013-04-08 Algebraic geometry seminar, Stanford University, Stanford, CA
2013-03-13 Algebraic geometry seminar, KTH, Stockholm, SWEDEN
2013-03-11 Opponent presentation, Stockholm University, Stockholm, SWEDEN
2013-02-01 Algebraic geometry and geometric modelling, BIRS, Banff, AB
2012-12-07 Combinatorial commutative algebra workshop, MSRI, Berkeley, CA
2012-09-06 Mathematics colloquium, Western University, London, ON
2012-08-27 Algebra seminar, Georgia Institute of Technology, Atlanta, GA
2012-06-04 Prize lecture, CMS meeting, Regina, SK
2012-05-07 Algebra seminar, Universidad de los Andes, Bogotá, COLOUMBIA
2012-05-03 Mathematics colloquium, Universidad de los Andes, Bogotá, COLOUMBIA
2012-02-22 Algebraic geometry seminar, University of Michigan, Ann Arbor, MI
2011-10-15 Algebraic geometry and commutative algebra session, AMS meeting, Lincoln, NE
2011-09-24 Route 81 conference, Cornell University, Ithaca, NY
2011-07-08 Computational algebraic geometry workshop, FoCM, Budapest, HUNGARY
2011-06-07 Toric geometry and applications, Katholiek Universiteit Leuven, Leuven, BELGIUM
2011-05-12 Algebraic geometry with a view towards applications, Mittag–Leffler, Djursholm, SWEDEN
2011-04-02 Southern Ontario groups and geometry meeting, Fields Institute, Toronto, ON
2011-03-05 Bellingham algebraic geometry seminar, University of British Columbia, Vancouver, BC
2011-03-04 Mathematics colloquium, University of British Columbia, Vancouver, BC
2010-12-06 Commutative algebra and combinatorics session, CMS meeting, Vancouver, BC
2010-10-02 Commutative algebra and algebraic geometry session, AMS meeting, Syracuse, NY
2010-10-01 Mathematics colloquium, Syracuse University, Syracuse, NY
2010-08-11 Macaulay2 workshop, Colorado College, Colorado Springs, CO
2010-06-28 Harmony of Gröbner bases and the modern industrial society, Osaka, JAPAN
2010-06-25 Classical algebraic geometry workshop, MFO, Oberwolfach, GERMANY
2010-05-04 Geometry and topology seminar, University of Glasgow, Glasgow, SCOTLAND
2010-04-14 Mathematics colloquium, KTH, Stockholm, SWEDEN
2010-02-18 Convex algebraic geometry, BIRS, Banff, AB
2010-02-11 Algebra seminar, University of Nebraska, Lincoln, NE
2010-02-10 Mathematics colloquium, University of Nebraska, Lincoln, NE
2009-12-14 Lutefisk seminar, Universitetet i Oslo, Oslo, NORWAY
2009-10-21 Algebra-combinatorics seminar, San Francisco State University, San Francisco, CA
2009-10-20 Commutative algebra seminar, University of California, Berkeley, CA
2009-09-30 Kombinatorikseminarier, KTH, Stockholm, SWEDEN
2009-09-09 Algebra-och geometriseminarier, KTH, Stockholm, SWEDEN
2009-07-09 Computer algebra session, Pacific Rim Mathematical Association (PRIMA) Congress, Sydney, AUSTRALIA
2009-07-06 Commutative algebra session, PRIMA Congress, Sydney, AUSTRALIA

2009-05-15 Mathematics colloquium, MSRI, Berkeley, CA
2009-04-24 Kommutative Algebra, MFO, Oberwolfach, GERMANY
2009-01-08 Toric geometry, MFO, Oberwolfach, GERMANY
2008-12-17 Commutative algebra session, CMS meeting, Ottawa, ON
2008-11-12 Workshop on syzygies and geometry, Korean Advanced Institute of Science and Technology (KAIST), Daejeon, SOUTH KOREA
2008-10-05 Hilbert functions session, AMS meeting, Vancouver, BC
2008-09-04 Mathematics colloquium, UIUC, Urbana, IL
2008-05-28 Commutative algebra, complexes, and applications workshop, Warwick Mathematics Institute, Coventry, ENGLAND
2008-05-13 Matrix factorizations in physics and mathematics, BIRS, Banff, AB
2008-04-04 Combinatorial commutative algebra session, AMS meeting, Bloomington, IN
2008-01-19 Combinatorial algebra meets algebraic combinatorics conference, Halifax, NS
2007-12-08 Algebraic stacks session, CMS meeting, London, ON
2007-10-21 Western algebraic geometry seminar (WAGS), Fort Collins, CO
2007-10-07 Toric varieties session, AMS meeting, New Brunswick, NJ
2007-07-07 Homological and combinatorial aspects in commutative algebra, Buşteni, ROMANIA
2007-06-11 Commutative algebra and its interaction with algebraic geometry, BIRS, Banff, AB
2007-05-29 Workshop: algebraic geometry and algebraic combinatorics, CRM, Montréal, QC
2007-05-11 Valley geometry seminar, University of Massachusetts, Amherst, MA
2007-04-28 Advances in algebra and geometry, MSRI, Berkeley, CA

2007-03-22 Mathematics colloquium, University of Western Ontario, London, ON
2007-03-09 Mathematics colloquium, Queen's University, Kingston, ON
2007-01-20 Algebraic combinatorics meets inverse systems conference, CRM, Montréal, QC
2006-10-18 Syzygies and Hilbert functions, BIRS, Banff, AB
2006-06-02 Commutative algebra conference honouring Winfried Bruns, Universtität Osnabrück, Osnabrück, GERMANY
2006-05-29 Seminar, Freie Universität, Berlin, GERMANY
2006-05-16 Seminario, Dipartimento di Matematica Università di Genova, Genova, ITALY
2006-05-11 Castelnuovo–Mumford regularity and related topics workshop, CIRM, Luminy, FRANCE
2006-04-30 Gröbner bases session, AMS meeting, San Francisco, CA
2006-04-08 Combinatorial algebraic geometry session, AMS meeting, Notre Dame, IN
2005-07-15 Canadian undergraduate mathematics conference, Kingston, ON
2005-06-06 Combinatorics and geometry session, CMS meeting, Waterloo, ON
2005-03-18 Geometry seminar, University of Waterloo, Waterloo, ON
2004-12-11 Commutative algebra session, CMS meeting, Montréal, QC
2004-07-09 Combinatorial commutative algebra workshop, MFO, Oberwolfach, GERMANY
2004-04-26 Algebraic geometry seminar, Brown University, Providence, RI
2004-03-12 Syzygies and Hilbert functions session, AMS meeting, Tallahassee, FL
2004-02-18 Algebra and geometry seminar, State University of New York, Stony Brook, NY
2004-01-28 Mathematics colloquium, Rutgers University, New Brunswick, NJ
2004-01-22 Mathematics colloquium, University of Kansas, Lawrence, KS
2004-01-22 Algebra seminar, University of Kansas, Lawrence, KS

2003-01-14 Mathematics colloquium, Queen's University, Kingston, ON
2003-01-12 Mathematics colloquium, UIUC, Champaign, IL
2003-12-03 Mathematics colloquium, Tulane University, New Orleans, LA
2003-11-03 Geometry-algebra-combinatorics seminar, Northeastern University, Boston, MA
2003-05-20 Algebra seminar, University of Washington, Seattle, WA
2003-05-04 Combinatorial commutative algebra session, AMS meeting, San Francisco, CA
2003-04-11 Algebraic geometry seminar, Stanford University, Stanford, CA
2003-03-05 Algebra seminar, University of California, Berkeley, CA
2003-01-29 Commutative algebra seminar, MSRI, Berkeley, CA
2002-11-08 Valley geometry seminar, University of Massachusetts, Amherst, MA
2002-06-20 Algebraic geometry and combinatorics, AMS meeting, Portland, OR
2002-06-14 Commutative algebra session, AMS meeting, Pisa, ITALY
2002-05-02 Algebraic geometry and commutative algebra session, AMS meeting, Montréal, QC
2002-04-25 Computational algebra seminar, Rutgers University, New Brunswick, NJ
2002-01-08 Computational algebra session, Joint mathematics meeting, San Diego, CA
2001-10-20 Algebraic geometry conference in memory of Ruth Michler, Annapolis, MD
2001-06-29 Computational algebraic geometry session, AMS meeting, Hoboken, NJ
2001-05-30 Algebraic geometry session, AMS meeting, Lawrence, KS
2001-02-02 Algebraic geometry seminar, Columbia University, New York, NY
2001-01-22 Algebraic/symplectic seminar, University of Toronto, Toronto, ON
2001-01-18 Commutative ring theory seminar, UIUC, Champaign, IL
2000-10-21 Algebraic geometry session, AMS meeting, San Francisco, CA
2000-09-23 Algebraic geometry session, AMS meeting, Toronto, ON
2000-05-19 Workshop on algorithms for $\mathscr{D}$-modules, Research Institute for Mathematical Sciences (RIMS), Kyoto, JAPAN
2000-05-18 Workshop on algorithms for $\mathscr{D}$-modules, RIMS, Kyoto, JAPAN
2000-01-07 Computational algebraic analysis workshop, MSRI, Berkeley, CA
1999-02-10 Gröbner basis workshop, Centro de Investigación en Matemáticas, Guanajuato, MEXICO

Conferences Organized

2017-12 Toric geometry session (with Matthew Satriano), CMS meeting, Waterloo, ON
2017-05 A view toward algebraic geometry (with Mircea Mustaţă, Daniel Erman, and Claudiu Raicu), Harbor View Hotel, Martha's Vineyard, MA
2017-02 Perspectives and emerging topics in algebra and combinatorics (with María Angélica Cueto, Christian Haase, and Alex Küronya), Haus Bergkranz, AUSTRIA
2016-12 Combinatorial moduli spaces (with Dan Abramovich, Izzet Coskun, Angela Gibney, and Mike Stillman), Fields Institute, Toronto, ON
2016-07 Graduate summer school on combinatorial algebraic geometry (with David A. Cox and Diane Maclagan), Fields Institute, Toronto, ON
Fall 2016 Combinatorial algebraic geometry thematic program (with David A. Cox, Megumi Harada, Diane Maclagan, and Ravi Vakil), Fields Institute, Toronto, ON
2016-04 Free resolutions and asymptotic algebra (with Daniel Erman), BIRS, Banff, AB
2015-10 Route 81 conference (with A.V. Geramita), Queen's University, Kingston, ON

2015-06 Commutative algebra (with Srikanth B. Iyengar, Karl Schwede, Liana Sega, and Wenliang Zhang), AMS Mathematics Research Community (MRC), Snowbird, UT
2015-01 Combinatorial algebra meets algebraic combinatorics (with Mike Roth and Hugh Thomas), Queen's University, Kingston, ON
2014-12 Computational algebraic geometry workshop (with Carlos D'Andrea and Agnes Szanto), FoCM, Montevideo, URUGUAY
2013-08 Software for algebraic geometry minisymposium, SIAM conference on applied algebraic geometry, Fort Collins, CO
2013-03 Perspectives and Emerging Topics in Algebra and Combinatorics (with María Angélica Cueto and Christian Haase), Haus Bergkranz, AUSTRIA
2012-10 Route 81 conference (with Tài Hà, Brian Harbourne, and Adam Van Tuyl), Queen's University, Kingston, ON
2012-05 Toric Boij–Söderberg theory (with Christine Berkesch and Daniel Erman), Research in Teams, BIRS, Banff, AB
2011-12 Algebraic geometry session (with A.V. Geramita), CMS meeting, Toronto, ON
2010-07 Components of Hilbert schemes workshop (with Robin Hartshorne and Diane Maclagan), American Institute of Mathematics (AIM), Palo Alto, CA
2009-02 Macaulay2 day (with Mike Stillman and Ravi Vakil), MSRI, Berkeley, CA
2008-10 Route 81 conference (with A.V. Geramita), Queen's University, Kingston, ON
2007-07 Research in Pairs (with Alastair Craw), MFO, Oberwolfach, GERMANY
2006-12 Commutative algebra and algebraic geometry session (with Ragnar-Olaf Buchweitz and Graham Leuschke), CMS meeting, Toronto, ON
2006-07 Computational/combinatorial commutative algebra workshop (with Ragnar-Olaf Buchweitz and Alexander Yong), Fields Institute, Toronto, ON
2006-07 AMS session on syzygies in commutative algebra and geometry (with Irena Peeva and Sorin Popescu), JMM, San Antonio, TX
2005-10 Route 81 conference (with A.V. Geramita), Queen's University, Kingston, ON

Other Selected Leadership Activities

2016– Editor of the *Journal of Pure and Applied Algebra*
2009– Managing editor of the *Journal of Software for Algebra and Geometry*
2015–2018 Member of the Mathematics and Statistics Evaluation Group for Natural Sciences and Engineering Research Council of Canada (NSERC)
2013–2016 Chair of Undergraduate Studies, Department of Mathematics and Statistics, Queen's University
2013–2015 Elected Vice-President (Ontario) of Canadian Mathematical Society (CMS)
2012 Panel chair for Ontario Graduate Scholarship Program
2007–2010 Elected Ontario Member of the CMS Board of Directors
2004–2006 Member of the AMS Policy Committee on Meetings and Conferences

Training of Highly Qualified Personnel

2015– Benjamin Hersey, PhD student
2013– Owen Ren, PhD student
2015–2017 Robert Krone, Postdoctoral Fellow, supervised with A.V. Geramita and D. Wehlau

2011–2016	Andrew Staal, PhD student
2013–2015	Federico Galetto, Postdoctoral Fellow, supervised with A.V. Geramita and D. Wehlau
2012–2013	Owen Ren, Master's student
2011–2013	Andrew Hoefel, Postdoctoral Fellow, supervised with A.V. Geramita and D. Wehlau
Summer 2012	Robert Embree, undergraduate summer student
2010–2012	Victor Lozovanu, Postdoctoral Fellow, supervised with A.V. Geramita and D. Wehlau
2010–2011	Adam McCabe, Master's student
2007–2009	Tristram Bogart, Postdoctoral Fellow, supervised with A.V. Geramita and M. Roth
2007–2008	Ethan Cotterill, Postdoctoral Fellow, supervised with A.V. Geramita and M. Roth
2005–2007	Antonio Laface, Postdoctoral Fellow, supervised with A.V. Geramita and M. Roth
2005–2007	Hadi Salmasian, Postdoctoral Fellow, supervised with I. Dimitrov and D. Wehlau
Summer 2005	Erica Blom, NSERC undergraduate student, supervised with A.V. Geramita
Summer 2005	Tim Kusalik, NSERC undergraduate student, supervised with A.V. Geramita

Membership in Professional Organizations

- American Mathematical Society (AMS)
- Canadian Mathematical Society (CMS)
- Mathematical Association of America (MAA)
- Society for Industrial and Applied Mathematics (SIAM)

KTH Engineering Sciences

Dept. of Applied Physics
Peter Unsbo

Rektor

Stockholm 2018-03-21

Request to associate Dr. Oskars Ozolins as affiliated faculty to the School of Engineering Sciences, KTH

We suggest that Dr. Oskars Ozolins (Senior Scientist at RISE Acreo AB) is enrolled as affiliated faculty (research and teaching) in optical communications at KTH. Dr. Ozolins received his undergraduate and Ph.D. degrees at Riga, Latvia. He joined RISE Acreo as a postdoc in Kista High Speed Transmission Lab under Prof. Gunnar Jacobsen's and Prof. Sergei Popov's supervision in 2015. In 2016 Dr. Ozolins was awarded a starting grant "PHASE" from the Swedish Research Council. This is the first successful starting grant from an applicant from RISE Acreo AB.

Dr. Ozolins has solid research and educational work experience in optical communications. In his professional career Dr. Ozolins has stayed as a guest researcher at III-V Lab (Nokia Bell Labs and Thales, France), DTU Fotonik (Technical University of Denmark, Denmark), IDLab (Ghent University – imec, Belgium) and FOTON laboratory (University of Rennes 1, France). During his visits Dr. Ozolins has acquired skills and research experience in leading optical communication laboratories. He has considerably contributed in three world record achievements in high speed transmission experiments. Along with his research accomplishments, Dr. Ozolins has 10 year experience in supervising students. He has supervised/co-supervised 36 bachelor students, 22 master students, 3 PhD students (2 completed) and 1 postdoc.

In September 2017, Dr. Ozolins was appointed technical area leader for optical transmission at RISE Acreo AB. He is a key person for the exchange of the scientific research results and knowledge obtained from two successfully completed EU Marie Curie international training network projects - ICONE and GRIFFON in close cooperation with Prof. Popov within the KTH-RISE Acreo jointly operated Kista High Speed Transmission Lab. The industry-academia knowledge transfer is being also completed through the VINNOVA funded industrial project SENDATE FICUS to reinforce Swedish leadership in optical communication and photonics integration, finally resulting in innovative products.

Dr. Ozolins is also involved in SSF industrial PhD student grant INDIUM received together with KTH and Finisar Sweden AB. A close cooperation between Dr. Ozolins and Prof. Popov focusing on optical communication is the basis for the industrial PhD student work. In order to achieve even better synergies between RISE Acreo and KTH operations, we see a clear advantage of linking Dr. Ozolins closer to the activities at KTH through affiliation as a faculty member at the level of 20% for the next three years. Furthermore, Dr. Ozolins is an excellent candidate to take full responsibility over the joint activities after Prof. Jacobsen's adjunct professorship will expire in early 2019.

Dr. Ozolins will contribute with his experience from cross-border research between optical transmission and photonic-assisted signal processing and act as a supervisor for doctoral students and postdocs. He will be also able to contribute to education programs at KTH, primarily by taking part in designing and managing graduate work to foster technology transfer. An affiliation is also in line with KTH's strategic goal of coming closer to Swedish industry relevant research through cooperation with Research Institutes of Sweden.

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The Strategic Council at the School of Engineering Sciences has been informed about the proposed affiliation. The salary for Dr. Ozolins during the affiliation period will be paid in full by RISE Acreo AB. Dr. Ozolins does not require an office at KTH since his current office at RISE Acreo AB in the Electrum building is conveniently located nearby. The school and the department are aware that the rules of the Work Environment Act apply to affiliated faculty during their stay at KTH.

CV of Dr. Oskars Ozolins is attached to the application as well as a letter from him where he accepts the affiliation. An acceptance letter from RISE Acreo is also attached.

Sincerely

Peter Unsbo

Head of department
Department of Applied Physics

Leif Kari

Head of School
School of Engineering Sciences

Roslagstullsbacken 21, SE-106 91 Stockholm. Tel: +46 8-5537 8102. Fax: +46 8-5537 8466.

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1. Personal information

Full Name	**Oskars Ozolins, Dr.sc.ing., PhD**
Field of Education	Telecommunications (specialized in optical communications)
Mobile Phone	+46 (0) 725570209, +371 20011193
E-mail	oskars.ozolins93@gmail.com, oskars.ozolins@ri.se
Web	LinkedIn, ORCID and Google Scholar

2. Education

Dates	August 2009 – May 2013
Title of Qualification Awarded	**Doctor of Engineering Science (in Electronics and Telecommunications), *Dr.sc.ing.*** Diploma No. D 0409
Title of Doctoral Thesis	Analysis and Realization of Wavelength Filters in Fiber Optic Transmission Systems
Name of Organization	Riga Technical University (RTU), Faculty of Electronics and Telecommunications (ETF), Institute of Telecommunications (TI), Riga, Latvia.
Title of Qualification Awarded	(2007 - 2009) Master of Engineering Science (in Telecommunications) with Distinction (2004 - 2007) Bachelor of Science in Electrical Engineering
Name of Organization	RTU ETF TI, Riga, Latvia

3. Work experience

Position	**Senior Scientist** (March 2018 – **currently**), link.
Main Responsibilities	Listed but not limited to: (1) Main responsible for Kista High Speed Transmission Lab. (2) Research on signal processing techniques related to data transmission, capture, storage, and analysis. (3) Applying for funding. (4) Management of the Swedish Research Council grant "PHotonic-Assisted signal proceSsing tEchniques (PHASE)" no. 2016-04510, 3.2 Million SEK (2017-2021).
Name and Address of Organization	**RISE Acreo AB**, Kista High Speed Transmission Lab (Kista HST-Lab), Box 1070, SE-164 25 Kista, Sweden.
Position	**Technical Lead** (September 2017 – **currently**), link.
Main Responsibilities	Listed but not limited to: (1) Serve as a bridge to transfer knowledge from research to industry through Kista High Speed Transmission Lab. (2) Research on industrial applications related to data transmission, capture, storage, and analysis. (3) Applying for funding.
Name and Address of Organization	**RISE Acreo AB**, Kista High Speed Transmission Lab (Kista HST-Lab), Box 1070, SE-164 25 Kista, Sweden.
Position	**Research Scientist** (February 2017 – February 2018).
Main Responsibilities	Listed but not limited to: (1) Main responsible for practical experimental work in Kista High Speed Transmission Lab. (2) Research on signal processing techniques related to data transmission, capture, storage, and analysis. (3) Applying for funding. (4) Management of the Swedish Research Council grant "PHotonic-Assisted signal proceSsing tEchniques (PHASE)" no. 2016-04510, 3.2 Million SEK (2017-2021).
Name and Address of Organization	**RISE Acreo AB**, Kista High Speed Transmission Lab (Kista HST-Lab), Box 1070, SE-164 25 Kista, Sweden.
Position	**Post Doc Researcher** (February 2015 – January 2017)
Main Responsibilities	Listed but not limited to: (1) Main responsible for practical experimental work in Kista High Speed Transmission Lab on optical communication systems. (2)

	Investigation on limitations, such as phase noise, bandwidth, nonlinearities and dispersion, on the overall system performance. (3) Applying for potential funding applications. The work is performed within the EU Marie Curie project "Allied Initiative for Training and Education in Coherent Optical Networks (ICONE)".
Name and Address of Organization	Supervisor **Prof. Gunnar Jacobsen, Swedish ICT Research AB**, Kista High Speed Transmission Lab (Kista HST-Lab), Box 1070, SE-164 25 Kista, Sweden.
Position	**Assistant Professor** (May 2014 – January 2015)
Main Responsibilities	Give lectures and co-supervise PhD, master and bachelor level students on the following topics: fiber optics, wavelength division multiplexing (WDM), wavelength filters, fiber Bragg gratings (FBG), micro-ring resonators (MRR), all-optical signal processing, directly modulated lasers (DML), thin film filters (TFF), and fiber optical parametric amplifiers (FOPA).
Name and Address of Organization	**Riga Technical University**, Faculty of Electronics and Telecommunications (ETF), Institute of Telecommunications (TI), Azenes street 12, Riga, Latvia, LV-1048.
Position	**Researcher** (September 2007 – January 2015)
Main Responsibilities	Carrying out research on following the topics: fiber optics, wavelength division multiplexing, wavelength filters, FBG, micro-ring resonators, and thin film filters.
Name and Address of Organization	Supervisor **Prof. Girts Ivanovs**, **Riga Technical University**, Faculty of Electronics and Telecommunications (ETF), Institute of Telecommunications, Azenes street 12, Riga, Latvia, LV-1048.
Position	**Lecturer** (January 2008 – June 2014)
Main Responsibilities	Co-supervising bachelor and master thesis on the following topics: structured cable systems, fiber optics, WDM, wavelength filters. Give lectures to bachelor and master level students.
Name and Address of Organization	**Riga Technical University**, Faculty of Electronics and Telecommunications (ETF), Institute of Telecommunications, Azenes street 12, Riga, Latvia, LV-1048.

4. Research visits

Position	**Guest Researcher** (February 2018 – February 2018)
Main Responsibilities	Perform experiments on high speed transmission with 100 GHz devices. **Record** on 204 Gbaud OOK transmission for interdatacenter reported at postdeadline paper session at OFC 2018.
Name and Address of Organization	Supervisor **Dr. Jean-Yves Dupuy, III-V Lab,** joint lab of Nokia Bell Labs, Thales Research and Technology and CEA Leti, 1 av. Augustin Fresnel, 91676 Palaiseau, France
Position	**Guest Researcher** (August 2017- August 2017)
Main Responsibilities	Perform experiments on high speed transmission with 100 GHz devices and multicore fibers.
Name and Address of Organization	Supervisor **Prof. Xin Yin** and **Prof. Johan Bauwelinck, Ghent University** - imec – iMinds, Technologiepark 15, 9052 Gent-Zwijnaarde, Belgium
Position	**Guest Researcher** (June2016 and August 2016)
Main Responsibilities	Perform experiments on high speed transmission with 100 GHz devices. **Record** on real-time 100 Gbaud Duobinary transmission for intradatacenter reported at postdeadline paper session at ECOC 2016.

Name and Address of Organization	Supervisor **Prof. Xin Yin** and **Prof. Johan Bauwelinck, Ghent University** - imec – iMinds, Technologiepark 15, 9052 Gent-Zwijnaarde, Belgium
Position Main Responsibilities	**Guest Researcher** (May 2016 – June 2016 and September 2016) Perform experiments on digital back propagation impact evaluation in higher order coherent optical communication systems with phase locked lasers and THz wireless transmission. **Record** on single-transmitter/single-receiver THz link (0.3-0.5 THz) with a record net data rate of 260 Gbit/s reported at postdeadline paper session at IPC 2016.
Name and Address of Organization	Supervisors **Prof. Darko Zibar** and **Prof. Leif Katsuo Oxenløwe, DTU Fotonik,** Department of Photonics Engineering, Ørsteds Plads 343 2800 Kgs. Lyngby, Denmark.
Position Main Responsibilities	**Guest Researcher** (May 2015 – May 2015) Prepare for experiments on equalization enhance phase noise impact evaluation in higher order coherent optical communication systems.
Name and Address of Organization	Supervisor **Prof. Sergei Popov, KTH Royal Institute of Technology**, School of Information and Communication Technology, Group of Optics and Photonics, Isafjordsgatan 22, SE 164 40, Kista, Stockholm County, Sweden.
Position Main Responsibilities	**Guest Researcher** (June 2014 – July 2014) Carrying out research on the following topics: optical access networks, DML, pulse amplitude modulation, chirp managed laser (CML), and Fabry–Pérot interferometers.
Name and Address of Organization	Supervisor **Prof. Christophe Peucheret, PERSYST FOTON Laboratory** (link), a joint research unit under the French National Centre for Scientific Research (CNRS UMR 6082), University of Rennes 1.
Position Main Responsibilities	**Guest Researcher** (January 2012 – April 2012) Carrying out research on the following topics: fiber optics, wavelength filters, MRR, all-optical modulation format conversion, and fiber optical parametric amplifiers.
Name and Address of Organization	Supervisor **Prof. Christophe Peucheret, DTU Fotonik,** Department of Photonics Engineering, Ørsteds Plads 343 2800 Kgs. Lyngby, Denmark

5. Supervising, co-supervising and mentoring activities

- In total **36** bachelor students since 2008, **23** master students since 2010
- Co-supervisor for **2** graduated PhD students:
  - J. Rodrigo Navarro, (2017). Phase Noise Tolerant Modulation Formats and DSP Algorithms for Coherent Optical Systems (PhD dissertation). Stockholm, Sweden. Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-207034
  - A. Kakkar, (2017). Frequency Noise in Coherent Optical Systems: Impact and Mitigation Methods (PhD dissertation). Stockholm, Sweden. Retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-207072
- Co-supervisor for 2 postdocs.
- Completed KTH course LH207V Doctoral Supervision 3.0 P on 2017-12-14
- Participated in courses as Lecturer and **Assistant Professor** at RTU:
  - RDE302 Transmission Media (9 ECTS),
  - RAE361 Digital Devices of Telecommunications Systems (4.5 ECTS),
  - RDE425 Scientific seminars (6 ECTS),
  - Laboratory works in RDE419 Fiber Optic Transmission Systems (9 ECTS)

6. Raised funding

- SSF industrial PhD student 2.5 MSEK 2018-2022. Co-Applicant.
- Swedish Research Council funded project as a starting grant "Photonic-assisted signal processing techniques (PHASE)", 2017, Applicant, Total amount 3.2 MSEK, 2017.02.02-2021.02.01
- VINNOVA (Swedish Governmental Agency for Innovation Systems) SENDATE Ficus 2017-2019 2.4 MSEK. Co-Applicant.
- European Union funded project "Allied Initiative for Training and Education in Coherent Optical Networks (ICONE)", 2015.02.01.- 2017.02.01., Co-applicant, Sub amount 108 000 EUR
- European Union funded project "Establishment of interdisciplinary ICT research group for transmission, processing and managing for a large volume of data", 2013-2015, Co-applicant, Sub amount 40 000 EUR
- Riga Technical University funded project "All-Optical Signal Processing with Micro- and Nano-Structured Devices for High-Speed Information Transmission", 2014, Applicant, Total amount 3000 EUR
- European Union funded project "Support for the implementation of doctoral studies at Riga Technical University", 2009-2013, Co-applicant, Sub amount 41000 EUR

7. Collaboration with industry

- SSF industrial PhD student project INDIUM 2018-2022 together with KTH and Finisar Sweden AB
- VINNOVA (Swedish Governmental Agency for Innovation Systems) SENDATE Ficus 2017-2019 together with Proximion AB, Finisar Sweden AB.
- RTU R&D project "Development of Mixed Fiber Optical Wavelength Division Multiplexing Transmission System," No. FLPP-2011/15.
- RTU R&D project "Investigation of Nonlinear Optical Coefficient Measurement Method in FOTS," No. ZP 2010.
- RTU R&D project „High-speed optical WDM systems development and evaluation," No. R7365/2009.

8. Contributions to peer-reviewed journals and organisation of international conferences, training events

Associate editor

- Journal of the European Optical Society-Rapid Publications since February 2018

Designated reviewer at journals

- Photonics Research, OSA, ISSN: 2327-9125.
- IEEE/OSA Journal of Lightwave Technology, OSA/IEEE, ISSN:1558-2213
- Optics Express, OSA, ISSN: 1094-4087.
- Optics Letters, OSA, ISSN: 0146-9592.
- Applied Optics, OSA, ISSN: 1539-4522.
- Chinese Optics Letters, Science Press/OSA, ISSN: 1671-7694.
- Journal of the European Optical Society, IOP, ISSN: 1990-2573.
- Optics Communications, Elsevier, ISSN: 0030-4018.
- Optical Fiber Technology, Elsevier, ISSN: 1068-5200
- Fiber and Integrated Optics, Taylor and Francis, ISSN: 1096-4681

Track co-chair

- The 10th International Conference on Advanced Infocomm Technology ICAIT2018, August 12th -15th 2018, Kista, Stockholm, Sweden.

Steering committee member at International conferences

- IEEE Advances in Wireless and Optical Communications **RTUWO2018**, November 15th -16th 2017, Riga, Latvia.

- IEEE Advances in Wireless and Optical Communications RTUWO2017, November 2nd -3rd 2017, Riga, Latvia.

Technical Programme committee member at International conferences

2018

- IEEE Advances in Wireless and Optical Communications RTUWO2018, November 15th -16th 2017, Riga, Latvia.
- The International Symposium on Intelligent Systems Technologies and Applications (ISTA2018), September 19th – 22nd 2018, Bangalore, India.
- International Conference on Advances in Computing, Communications and Informatics (ICACCI2018), September 19th – 22nd 2018, Bangalore, India.

2017

- IEEE Advances in Wireless and Optical Communications RTUWO2017, November 2nd -3rd 2017, Riga, Latvia.
- 7th International Work Shop on Fiber Optics in Access Networks FOAN2017, November 7th 2017, Munich, Germany.
- The International Symposium on Intelligent Systems Technologies and Applications (ISTA2017), September 13th – 16th 2017, Karnataka, India.
- International Conference on Advances in Computing, Communications and Informatics (ICACCI2017), September 13th – 16th 2017, Karnataka, India.

2016

- IEEE Advances in Wireless and Optical Communications RTUWO2016, November 3rd-4th 2016, Riga, Latvia.
- 6th International Work Shop on Fiber Optics in Access Networks FOAN2016, October 18th – 20th 2016, Lisbon, Portugal.
- The International Symposium on Intelligent Systems Technologies and Applications (ISTA2016), September 21st – 24th 2016, Jaipur, India.
- International Conference on Advances in Computing, Communications and Informatics (ICACCI2016), September 21st – 24th 2016, Jaipur, India.
- Organized annual intensive training week and workshop within ICONE project.

2015

- IEEE Advances in Wireless and Optical Communications RTUWO2015, November 5th-6th 2015, Riga, Latvia.

2014

- Global Summit on Computer & Information Technology (GSCIT2014), June 14th - 16th 2014, Sousse, Tunisia.

Contributed as designated reviewer in **38 International conferences**

9. Prizes, awards and scholarships

- French Embassy/Institut français de Suède mobility grant 2018.
- Erasmus practice scholarship 2014 CNRS UMR FOTON for one month.
- „Werner von Siemens Excellence Award" for doctoral thesis "Analysis and Realization of Wavelength Filters in Fibre Optic Transmission Systems" 2014.
- ESF scholarship for PhD studies 2009 - 2013.
- Erasmus practice scholarship 2012 DTU Fotonik for three months.
- „Werner von Siemens Excellence Award" for master thesis „Investigation of Bragg grating applications in perspective WDM systems" 2009.

- „2nd level of Samsung Electronics Annual Grant" for bachelor studies 2007.
- Iras un Petera Bolsaitis scholarship from Vitolu fund 2005 - 2007.

10. Memberships of scientific societies and institutional responsibilities

- Latvian Optical Society (LOS) member since 2009.
- Optical Society of America (OSA) member since 2009.
- Institute of Electrical and Electronics Engineers (IEEE) member since 2009.
- Student representative at RTU ETF council 2011 - 2013.
- Latvian Council of Science Expert. Committee: Engineering and computer science, elected till 2019.05.19; Physics, elected till 2020.08.17.
- H2020 expert.
- Board member of "Stockholm's Latvian School" since February 2016.

11. Publications in peer-reviewed scientific journals, peer-reviewed conference proceedings, granted patents, scientific monographs, book chapters and invited presentations

Peer-reviewed scientific journals

2018

[1] A. Marinins, **O. Ozolins**, X. Pang, A. Udalcovs, J. Rodrigo Navarro, A. Kakkar, R. Schatz, G. Jacobsen, S. Popov "Thermal Reflow Engineered Cylindrical Polymer Waveguides for Optical Interconnects," in IEEE Photonics Technology Letters, 30(5), 447-450, (2018).

[2] L. Zhang, X. Hong, X. Pang, **O. Ozolins**, A. Udalcovs, R. Schatz, C. Guo, J. Zhang, F. Nordwall, K. M. Engenhardt, U. Westergren, S. Popov, G. Jacobsen, S. Xiao, W. Hu, J. Chen, "Nonlinearity-aware 200-Gbit/s discrete multi-tone transmission for C-band short-reach optical interconnects with a single packaged EML", Opt. Lett. 43(2), 182-185, (2018).

[3] S. Jia, X. Pang, **O. Ozolins**, X. Yu, H. Hu, J. Yu, P. Guan, F. Da Ros, S. Popov, G. Jacobsen, M. Galili, T. Morioka, D. Zibar, L. K. Oxenløwe"0.4 THz Photonic-Wireless Link with 106 Gbit/s Single Channel Bitrate," IEEE/OSA J. Lightwave Technol., **invited** paper, 36(2), 610-616, (2018).

2017

[4] L. Zhang, X. Pang, **O. Ozolins**, A. Udalcovs, R. Schatz, U. Westergren, G. Jacobsen, S. Popov, L. Wosinska, S. Xiao, W. Hu, J. Chen, "Differential pulse code modulation with suppressed quantization noise for digital mobile fronthaul," Optics Express, 25 (25), 31921-31936, (2017).

[5] X. Pang, **O. Ozolins**, R. Schatz, J. Storck, A. Udalcovs, J. Rodrigo Navarro, A. Kakkar, G. Maisons, M. Carras, G. Jacobsen, S. Popov, S. Lourdudoss, "Gigabit free-space multi-level signal transmission with a mid-infrared quantum cascade laser operating at room temperature," Opt. Lett. 42 (18), 3646-3649, (2017).

[6] J. Rodrigo Navarro, A. Kakkar, R. Schatz, X. Pang, **O. Ozolins**, A. Udalcovs, S. Popov, G. Jacobsen, "Blind Phase Search with Angular Quantization Noise Mitigation for Efficient Carrier Phase Recovery," Photonics 4(2), 37, (2017).

[7] V. Cristofori; F. Da Ros; **O. Ozolins**; M. Chaibi; L. Bramerie; Y. Ding; X. Pang; A. Shen; A. Gallet; G. H. Duan; K. Hassan; S. Olivier; S. Popov; G. Jacobsen; L. K. Oxenloewe; C. Peucheret, "25-Gb/s Transmission Over 2.5-km SSMF by Silicon MRR Enhanced 1.55-μm III-V/SOI DML," IEEE Photonics Technology Letters , 29(12), 960-963, (2017)

[8] A. Kakkar, J. Rodrigo Navarro, R. Schatz, X. Pang, **O. Ozolins**, A. Udalcovs, H. Louchet, S. Popov, G. Jacobsen, "Laser frequency noise in coherent optical systems: spectral regimes and impairments," Scientific Reports (Nature) 7, Article number: 844, (2017).

[9] X. Pang, **O. Ozolins**, A. El-Taher, R. Schatz, G. Jacobsen, S. Sergeyev, S. Popov, "Experimental Evaluation of Impairments in Unrepeatered DP-16QAM Link with Distributed Raman Amplification," Photonics, 4(1), 16, (2017).

[10] X. Pang, **O. Ozolins**, S. Gaiarin, A. Kakkar, J. Rodrigo Navarro, M. Iglesias Olmedo, R. Schatz, A. Udalcovs, U. Westergren, D. Zibar, S. Popov G. Jacobsen, "Experimental Study of 1.55-μm EML-Based

Optical IM/DD PAM-4/8 Short Reach Systems," IEEE Photonics Technology Letters, 29(6), 523-526, (2017).

[11] M. Verplaetse, R. Lin, J. Van Kerrebrouck, **O. Ozolins**, T. De Keulenaer, X. Pang, R. Pierco, R. Vaernewyck, A. Vyncke, R. Schatz, U. Westergren, G. Jacobsen, S. Popov, J. Chen, G. Torfs, J. Bauwelinck, X. Yin, "Real-Time 100 Gb/s Transmission using 3-Level Electrical Duobinary Modulation for Short-reach Optical Interconnects" IEEE/OSA J. Lightwave Technol., **invited** paper, 35(7), 1313-1319, (2017).

[12] **O. Ozolins**, M. Iglesias Olmedo, X. Pang, S. Gaiarin, A. Kakkar, J. Rodrigo Navarro, A. Udalcovs, K. M. Engenhardt, T. Asyngier, R. Schatz, J. Li, F. Nordwall, U. Westergren, D. Zibar, S. Popov, G. Jacobsen, "100 GHz Externally Modulated Laser for Optical Interconnects," IEEE/OSA J. Lightwave Technol., **invited** paper, 35(6), 1174-1179, (2017).

2016

[13] M. Iglesias Olmedo, X. Pang, R. Schatz, **O. Ozolins**, H. Louchet, D. Zibar, G. Jacobsen, I. Tafur Monroy, S. Popov, "Effective Linewidth of Semiconductor Lasers for Coherent Optical Data Links," Photonics; 3(2) 39 (2016).

[14] J. Rodrigo Navarro, A. Kakkar, X. Pang, M. Iglesias Olmedo, **O. Ozolins**, F. Da Ros, M. Piels, R. Schatz, D. Zibar, G. Jacobsen, S. Popov, "Two-Stage n-PSK Partitioning Carrier Phase Recovery Scheme for Circular mQAM Coherent Optical Systems," Photonics. 3(2), 37 (2016).

[15] J. Rodrigo Navarro, A. Kakkar, X. Pang, **O. Ozolins**, R. Schatz, M. Iglesias Olmedo, G Jacobsen, S. Popov, "Carrier Phase Recovery Algorithms for Coherent Optical Circular mQAM Systems," IEEE/OSA J. Lightwave Technol. 34(11), 2717-2723 (2016).

[16] A. Kakkar, J. Rodrigo Navarro, R. Schatz, X. Pang, **O. Ozolins**, H. Louchet, G. Jacobsen, S. Popov, "Equalization Enhanced Phase Noise in Coherent Optical Systems with Digital Pre- and Post-Processing," Photonics 3(2), 12 (2016).

2015

[17] A. Kakkar, J. Rodrigo Navarro, R. Schatz, H. Louchet, X. Pang, **O. Ozolins**, G. Jacobsen, S. Popov, "Comprehensive Study of Equalization-Enhanced Phase Noise in Coherent Optical Systems," IEEE/OSA J. Lightwave Technol. 33(23), 4834-4841 (2015).

[18] J. Rodrigo Navarro, X. Pang, A. Kakkar, **O. Ozolins**, R. Schatz, G. Jacobsen, S. Popov, "Adaptive Boundaries Scheme for Cycle-Slip Mitigation in C-mQAM Coherent Systems," IEEE PTL, 27(20), 2154-2157 (2015).

[19] A. Kakkar, J. Rodrigo Navarro, R. Schatz, X. Pang, **O. Ozolins**, H. Louchet, G. Jacobsen, S. Popov, "Mitigation of EEPN in Coherent Optical Systems with Low-Speed Digital Coherence Enhancement," IEEE PTL, 27(18), 1942-1945 (2015).

[20] A. Kakkar, R. Schatz, X. Pang, J. Rodrigo Navarro, H. Louchet, **O. Ozolins**, G. Jacobsen, S. Popov, "Impact of local oscillator frequency noise on coherent optical systems with electronic dispersion compensation," Opt. Express 23(9), 11221-11226 (2015).

[21] **O. Ozolins**, V. Bobrovs, "Theoretical study of all-optical RZ-OOK to NRZ-OOK format conversion in uniform FBG for mixed line-rate DWDM systems," Chin. Opt. Lett. 13(6), 060603-060603 (2015).

[22] **O. Ozolins**, I. Trifonovs, R. Parts, V. Bobrovs, "All-Optical NRZ-to-PRZ Format Conversion Limitations Using Notch Filters," Elektron. Elektrotech. 21(1), 64-69 (2015).

2013

[23] **O. Ozolins**, V. Bobrovs, G. Ivanovs, "Cascadability of Uniform Fibre Bragg Grating for 40 Gbit/s RZ-OOK to NRZ-OOK Conversion," OPJ 3(2B) 950-955 (2013).

2012

[24] M. Xiong, **O. Ozolins**, Y. Ding, B. Huang, Y. An, H. Ou, C. Peucheret, X. Zhang, "Simultaneous RZ-OOK to NRZ-OOK and RZ-DPSK to NRZ-DPSK format conversion in a silicon microring resonator," Opt. Express 20(25), 27263-27272 (2012).

2011

[25] **O. Ozolins**, G. Ivanovs, "Estimation of DWDM Transmission for Broadband Access with FBG Technology," Elektron. Elektrotech. 111(5), 11-14 (2011).

[26] **O. Ozolins**, V. Bobrovs, G. Ivanovs, I. Lasuks, "New-Generation Optical Access System Based on the Thin Film Filter Technology" Int. J. Phys. Sci. 6(35) 7926-7934 (2011).

[27] **O. Ozolins**, V. Bobrovs, G. Ivanovs, "DWDM Transmission Based on the Thin-Film Filter Technology," LJPTS 48(3) 55-65 (2011).

2010

[28] **O. Ozolins**, G. Ivanovs, "Evaluation of Band-Pass Filters Influence on NRZ Signal in HDWDM Systems," Elektron. Elektrotech. 100(4), 11-14 (2010).

[29] V. Bobrovs, **O. Ozolins**, G. Ivanovs, "Investigation into the potentialities of quasi-rectangular optical filters in HDWDM systems," LJPTS 47(1) 17-29 (2010).

[30] **O. Ozolins**, V. Bobrovs, G. Ivanovs, "Efficient Wavelength Filters for DWDM Systems," LJPTS 47(6) 47-58 (2010).

[31] V. Bobrovs, **O. Ozolins**, G. Ivanovs, J. Porins, "Realization of HDWDM Transmission System", Int. J. Phys. Sci. 5(5) 452-458 (2010).

2009

[32] **O. Ozolins**, G. Ivanovs, "Realization of Optimal FBG Band–Pass Filters for High Speed HDWDM," Elektron. Elektrotech. 4(92), 41-44 (2009).

2008

[33] I. Lasuks, A. Scemelevs, **O. Ozolins**, "Investigation of spectrum-sliced WDM system," Elektron. Elektrotech. 5(85), 45-48 (2008).

Peer-reviewed conference proceedings

2018

[34] I. Lavrinovica, A. Supe, A. Udalcovs, **O. Ozolins**, S. Popov, J. Porins "Exploration of Optical Amplifiers Based on Erbium (Er3+) and Ytterbium (Yb3+) Doped Fiber Segments and Their Emerging Applications," in Proc. of PIERS 2018, invited paper

[35] A. Udalcovs, **O. Ozolins**, X. Pang, J. Rodrigo Navarro, R. Lin, M. Levantesi, L. Gan, R. Schatz, A. Djupsjobacka, J. Martensson, M. Tang, S. Fu, D. Liu, W. Tong, J. Chen, G. Jacobsen, S. Popov "Towards Coherent Detection in SDM-based Optical Access Networks," in Proc. of PIERS 2018, invited paper

[36] **O. Ozolins**, X. Pang, A. Udalcovs, L. Zhang, R. Schatz, U. Westergren, G. Jacobsen, S. Popov, J. Chen "Short Reach Optical Interconnects with Single Externally Modulated Laser Operated in C-band," in Proc. of ICTON 2018 (IEEE, 2018), invited paper

[37] X. Pang, J. Van Kerrebrouck, **O. Ozolins**, R. Lin, A. Udalcovs, L. Zhang, S. Spiga, M. C. Amann, G. Van Steenberge, L. Gan, M. Tang, S. Fu, R. Schatz, G. Jacobsen, S. Popov, D. Liu, W. Tong, G. Torfs, J. Bauwelinck, X. Yin, J. Chen "High-speed SDM Interconnects with Directly-Modulated 1.5-μm VCSEL enabled by Low-Complexity Signal Processing Techniques," in Proc. of SPPCom 2018 (OSA, 2018), invited paper

[38] R. Lin, J. Van Kerrebrouck, X. Pang, M. Verplaetse, **O. Ozolins**, A. Udalcovs, L. Zhang, L. Gan, M. Tang, S. Fu, R. Schatz, U. Westergren, S. Popov, D. Liu, W. Tong, T. De Keulenaer, G. Torfs, J. Bauwelinck, X. Yin, J. Chen "Spatial Division Multiplexing for Optical Data Center Networks," in Proc. of ONDM 2018 (IEEE, 2018), invited paper

[39] **O. Ozolins**, F. Da Ros, V. Cristofori, X. Pang, A. Udalcovs, R. Schatz, L.K. Oxenløwe, S. Popov, G. Jacobsen, and C. Peucheret "Impact of Phase-Filtering on Optical Spectral Reshaping with Microring Resonators for Directly-Modulated 4-PAM Signals," in Proc. of CLEO 2018, (OSA, 2018), paper SM2C.5

[40] A. Marinins, A. Udalcovs, **O. Ozolins**, X. Pang, J.G.C. Veinot, G. Jacobsen, I. Sychugov, J. Linnros, S. Popov "All-Optical Intensity Modulation in Polymer Waveguides Doped with Si Quantum Dots," in Proc. of CLEO 2018, (OSA, 2018), paper JW2A.31

[41] L. K. Oxenløwe, S. Jia, X. Pang, **O. Ozolins**, X. Yu, H. Hu, P. Guan, F. Da Ros, S. Popov, G. Jacobsen, M. Galili, D. Zibar, T. Morioka "100s Gigabit/s THz Communication," in CLEO 2018, (OSA, 2018), tutorial paper STu3D.1

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[118] S. Popov, A. Kakkar, J. R. Navarro, X. Pang, **O. Ozolins**, R. Schatz, H. Louchet, and G. Jacobsen, " Equalization-Enhanced Phase Noise in Coherent Optical Communications Systems", Invited talk at ICTON 2016,Trento, Italy, 10th-14th of July, 2016.

[119] X. Pang, **O. Ozolins**, A. El-Taher, R. Schatz, G. Jacobsen, S. Popov, S. Sergeyev "Experimental Evaluation of Noise Impairments in Unrepeated Distributed Raman Amplified DP-16QAM SSMF Links" Invited talk at PIERS2015, Prague, Czech Republic, 6th – 9th of July 2015.

[120] **O. Ozolins** "Fiber Optics for a Brighter Future -- from Basics to the State-of-the-Art," Invited three hours tutorial at SweCTW 2015, Karlstad University, May 2015.

[121] **O. Ozolins**, "Wavelength filters for all-optical signal processing," Invited talk at Developments in Optics and Communications (LU), Riga, Latvia, 9th to 12th of April 2014.

[122] C. Peucheret, Y. Ding, H. Ou, M. Xiong, Y. An, A. Lorences Riesgo, J. Xu, **O. Ozolins**, H. Hu, M. Galili, B. Huang, M. Pu, H. Ji, J. Seoane, L. Liu, X. Zhang, "Linear Signal Processing Using Silicon Micro-Ring Resonators," Invited talk at POEM2012-IONT (OSA), Wuhan, China, 1st – 2nd of November 2012.

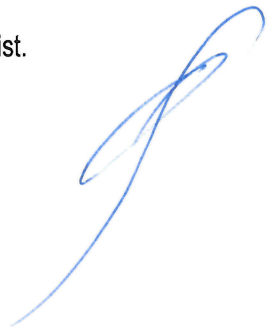
March 29, 2018

Application for an affiliated faculty

Hereby I apply for affiliated faculty (Forskning och Undervisning) in optical communications at the KTH Royal Institute of Technology School of Engineering Sciences.

I am already involved in all joint KTH/RISE research activity and significantly contribute in knowledge transfer between academia and industry through Kista High Speed Transmission Lab.

I enclose my application: CV and publication list.



Best regards,
Oskars Ozolins, Dr.sc.ing., PhD
Research Institutes of Sweden
RISE ICT/Acreo
Senior Scientist & PHASE Project Manager
Technical lead for optical communications
+46 72 557 02 09
oskars.ozolins@ri.se
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https://www.acreo.se/groups/kista-hst-lab

KTH, School of Engineering Sciences

March 19, 2018

To whom it may concern,

Dr. Oskars Ozolins, Senior Scientist of RISE Acreo AB, has been engaged Kista High Speed Transmission Lab jointly operated by at the jointly operated by RISE Acreo AB and KTH Royal Institute of Technology.

RISE Acreo evaluates Dr. Oskars Ozolins involvement greatly and hereby states that Dr. Oskars Ozolins is allowed to work as affiliated faculty (Forskning och Undervisning) in optical communications on part-time now at the School of Engineering Sciences, SCI KTH (maximum time is 20%, 1 day per week).

The motivation is the close cooperation within the Kista High Speed Transmission Lab and as a continuation after Prof. Gunnar Jacobsen's adjunct professorship expires in early 2019.

The salary for the work will be fully paid by RISE Acreo AB. The affiliated faculty role does not require any further exchange of finances between KTH and RISE Acreo AB. Dr. Oskars Ozolins does not require an office at KTH since his current office at RISE Acreo AB in the Electrum building is conveniently nearby located.

Sincerely yours,

Peter Björkholm
President and CEO
RISE Acreo
Box 1070, SE-164 25, Kista, Sweden
Phone: +46 (0)70 915 18 09
Mail: peter.bjorkholm@ri.se

Förslag på inrättande av lektorat i Marina system

Bakgrund

Institutionen för Farkoster och Flyg är en verksamhet inriktad mot farkoster och fordon samt system kring farkoster och innefattar allt från undervattensteknik till rymd. Våra forskningsgrupper är; ljud och vibrationer, lättkonstruktioner, fordonsdynamik, flygdynamik, aerodynamik, järnvägsteknik, marina system och rymdteknik. Forskningen vi bedriver är ofta en kombination av teoretiska studier, numerisk modellering och experimentell teknik. Under de senaste åren har vår forskning inriktats mer och mer mot multi-disciplinära problemställningar ofta i samverkan med andra forskningsgrupper vid KTH eller i internationella sammanhang.

Marina System har vuxit kontinuerligt sedan 2002 då miljön bildades och omfattar idag forskning och utbildning inom fartygstekik och utveckling av maritim robotik. Denna breddning och diversifiering medför ett behov av fakultetsförnyelse.

Inom fartygsteknik fokuseras på fartygsdynamik samt mindre höghastighetsfartyg. Inom dessa områden har miljön varit internationellt framgångsrik och tack vare detta etablerat strategiska kontakter i framförallt Europa, Japan och USA. Forskningsresultaten har också påverkat internationell praxis inom relevanta områden.

Marina system har även på senare tid etablerat sig som den nationella akademiska noden för undervattensteknik. Ett större nationellt center, Swedish Maritime Robotics Center, SMaRC, leds av gruppen med parter inom akademin, myndigheter och industri.

Inom området Maritim Robotik bedriver Marina system ett flertal projekt rörande autonoma ytfarkoster samt kringrörande metodik som *mission planning*, *formation control* för t.ex. kartering av okänd maritim miljö. Dessa projekt bedrivs både inom gruppen och med internationella partners som NTNU, University of Porto, etc.

Gruppen Marina System utvecklar även tillsammans med t.ex. Stockholms Universitet autonoma mätsystem för långtidsmonitorering av oceanografiska förhållanden vid polarområden.

Motivering av ämnet

Marina system fokuserar idag på mindre fartyg, specialfartyg och system av fartyg. Inriktningen är ett resultat av regionens behov och områden där Sverige är strategiskt starka.

I relation till specialfartyg och högprestandafartyg stödjer Marina system samhället med teknikutveckling och med att stärka hållbarhet, säkerhet och prestanda. Forskningen har en nära

anknytning till Försvarsmakten och andra statliga redare såsom Kustbevakningen och Sjöfartsverket och de speciella behov som sådana redare har oavsett var i världen de verkar. I förhållande till specialfartyg och högprestandafartyg innebär således forskningen också teknikutveckling i samarbete med industri vilket bidrar till fortsatt utveckla industrins internationella konkurrenskraft.

I relation till transportsystem och system av fartyg bedriver miljön forskning kring godstransporter inom framförallt närsjöfart och inre vattenvägar inklusive intermodalitet, persontransport inklusive intermodalitet för urbana miljöer, säkerhet och regelutveckling, samt teknikutveckling, för bl.a. hållbarhet och autonomi.

Strategisk betydelse för KTH

Ämnet Marina system (tidigare ≈Skeppsteknik) har lång tradition på KTH. Ämnet lockar kontinuerligt ett segment studenter som söker till KTH med siktet på den marina branschen från första dagen. Utöver detta attraherar programmen Marina System och Nordic Master in Maritime Engineering ett antal internationella studenter. Utöver grundutbildningen har myndigheter som FMV, Försvarsmakten, Sjöfartsverket etc. under lång tid tydligt visat intresse för att KTH upprätthåller ämnet genom olika former av projekt, anslag och andra engagemang. För KTH utgör ämnet Marina system ett av ”benen” i den långa tradition av farkostteknisk utbildning/forskning som är unik för KTH.

Motivering utifrån institutionens strategiska fakultetsutveckling

Med hänvisning till ämnets betydelse för KTH är det uppenbart att Marina system utgör en viktig del av institutionens karaktär. Förnyelsen som ämnet genomgått under senaste decenniet är anmärkningsvärt, inspirerande och ser långsiktigt livskraftig ut. Institutionen identifierar dock här ett fakultetsbehov associerat till gruppens expansion. Gruppens fakultet består idag av en professor, två lektorer och två forskare. En av de två lektorerna har inom KTH övergått till andra sysslor, KTH ECE, och arbetar endast 20% inom ämnet Marina system med sikte på att helt avsluta engagemanget inom området under 2018. Gruppen har i dagsläget 9 heltidsdoktorander sittandes på KTH och ansvarar för 11 GRU-kurser som omsätter ca 1.5Mkr årligen samt två masterprogram. Behovet av fakultetsrekrytering av minst en ny lektor är stort.

Kurser i Marina system

SD1710	Introduktion till Marina system	15 ects
SD2702	Marindesign	20 ects
SD2705	Höghastighetsfartyg	6 ects
SD2706	Segling för prestanda	6 ects
SD2709	Undervattensteknik	7.5 ects
SD2711	Design av mindre fartyg	10 ects
SD271X	Examensarbete	30 ects
SD2721	Fartygsdesign	9 ects
SD2722	Marina strukturer	7.5 ects
SD2723	Marin hydromekanik	7.5 ects
SD2725	Introduktion till marinteknik	6 ects

Ämnesområdet ur jämställdhetsperspektiv

Ämnesområdet är mansdominerat, både i Sverige och internationellt. Det är av stor betydelse att andelen kvinnlig fakultet ökar på institutionen. Under rekryteringsprocessen kommer det att vara centralt för oss att inte missa kvalificerade kvinnliga kandidater.

Ämnesområdet ur ett hållbarhetsperspektiv

Transportnäringen står för stora hållbarhetsutmaningar, men erbjuder samtidigt hållbarhetsmöjligheter till samhället i stort regionalt, i Sverige, i Europa och internationellt.

Planering av basfinansiering och arbetsuppgifter för de första fem åren

Finansiering för de första fem åren täcks av grundutbildnings- och fakultetsanslag samt medel från ovan nämnda Swedish Maritime Robotics Center, SMaRC.

Lista på potentiella sakkunniga

Karin Andersson Chalmers University of Technology, Sweden

Paola Gualeni, University of Genoa, Italy

Ermina Begovic, University of Naples Federico II, Italy

Margareta Lützhöft, University of Tasmania, Australia ??

Pandeli Temarel, Univeristy of Southampton, UK

Dominic Hudson, University of Southampton, UK

Lex Keuning, Delft University of Techology, The Netherlands

Odd Faltinsen, NTNU, Norway

KTH 2018-04-24

Sebastian Stichel	Jakob Kuttenkeuler
Prefekt	Ledare för forskargruppen Marina System

Anställningsprofil för lektor i Marina system

Ämnesområde
Marina system

Ämnesbeskrivning
Ämnet för anställningen är marina system med inriktning mot mindre fartyg och specialfartyg och deras konstruktion, sjöegenskaper och säkerhet med fokus på operationella funktion, hållbarhet och roll i det multimodala transportsystemet. Ämnet inkluderar därmed områden såsom marin hydromekanik, skeppsteknik, fartygskonstruktion, operationsanalys inklusive riskhantering, statistik och människa-maskinsystem (*Human factors engineering*).

Arbetsuppgifter

Innehavaren av tjänsten förväntas forska samt undervisa både på grundläggande samt avancerade kurser inom ämnet.

Innehavaren av tjänsten förväntas skapa nya nätverk inom och utom KTH, aktivt ansöka om forskningsfinansiering och utveckla både befintliga och nya kurser på såväl grund-, avancerad- som forskarnivå. Den sökande skall bidra till utvecklingen av institutionens utbildningsprogram samt handleda examensarbeten och doktorander inom ämnesområdet.

Lektorn kommer att ges möjlighet att utveckla sin självständighet som forskare och få meriter som kan ge behörighet för en annan läraranställning som det ställs högre krav på behörighet för (se 4 kap. 12 a § högskoleförordningen).

Behörighet
Behörig att anställas är den som har avlagt doktorsexamen eller har uppnått motsvarande vetenskaplig kompetens. Främst bör den komma i fråga som har avlagt doktorsexamen samt därutöver har dokumenterade pedagogiska meriter såväl som forskningsmeritering.

Bedömningsgrunder

Det är av *högsta betydelse* att den sökande

- kan bedriva forskning på hög internationell nivå inom ämnet för tjänsten, dokumenterad genom publikationer i internationella vetenskapliga tidskrifter.
- kan bedriva och leda pedagogiskt utvecklingsarbete inom ämnet för utlysningen, baserat på pedagogisk erfarenhet relevant för tjänsten vilket ska inkludera åtminstone erfarenhet av egen undervisning, kursansvar och kursutveckling på avancerad nivå.
- kan arbeta med ansökningar, forskning och bedriva undervisning både på svenska och på engelska.
- har vetenskaplig skicklighet visad genom vetenskaplig publicering, konferensdeltagande, etablering av forskningssamarbeten samt andra åtaganden i vetenskapssamhället såsom exempelvis granskning- eller sakkunniguppdrag.

Det är av *näst högsta betydelse* att den sökande

- har redan väl etablerade nationella och internationella kontakter och nätverk inom ämnet för utlysningen.
- har intresse för och insikter rörande pedagogisk utveckling inom ämnet för utlysningen.
- har intresse för och insikter rörande samverkan med det omgivande samhället av relevans för utlysningen.
- har potential till självständig utveckling som forskare och lärare inom aktuellt ämnesområde samt förmåga till etablering, förnyelse och utveckling av aktuellt forskningsområde.

Det är *även av betydelse* att den sökande

- har administrativ skicklighet och annan skicklighet.
- har intresse för och insikter rörande ledarskap i akademin samt medvetenhet om mångfalds- och likabehandlingsfrågor med särskilt fokus på jämställdhet
- har postdoktorsvistelse i annan forskningsmiljö än det lärosäte den sökande disputerat vid. I tillämpningsnära områden kan erfarenhet från forsknings- och utvecklingsarbete inom industrin eller andra organisationer bedömas motsvara en traditionell postdoktorsvistelse vid ett annat lärosäte.

Förslag på inrättande av biträdande lektorat i Fordonsteknik på KTH

Bakgrund

Institutionen för Farkoster och Flyg är en verksamhet inriktad mot farkoster och fordon samt system kring farkoster och innefattar allt från undervattensteknik till rymd. Våra forskningsgrupper är; ljud och vibrationer, lättkonstruktioner, fordonsdynamik, flygdynamik, aerodynamik, järnvägsteknik, marina system och rymdteknik. Forskningen vi bedriver är ofta en kombination av teoretiska studier, numerisk modellering och experimentell teknik. Under de senaste åren har vår forskning inriktats mer och mer mot multi-disciplinära problemställningar ofta i samverkan med andra forskningsgrupper vid KTH eller i internationella sammanhang.

Ämnet Fordonsteknik har en lång tradition i Sverige och på KTH. Verksamheten är mycket aktiv både inom undervisning, forskning och samverkan och är ett viktigt ämne för konkurrenskraften i svensk industri.

Detta biträdande lektorat är en del av den strategiska satsningen TRENoP, Transport Research Environment with Novel Perspectives som arbetar med lösningar för att göra transportsystemen grönare, smartare och säkrare genom integrering av politik och teknik med ett systemperspektiv. Partners inkluderar Linköpings universitet och Väg- och transportforskningsinstitutet.

För att förstärka TRENoP annonseras nu 6 nya tjänster där 5 är inom ABE (Trafikteknik inriktat mot väg, Tågplanering, Transportsystemanalys mot planering/klimat/miljö, Transportsystemanalys mot ekonomi samt Vägteknik med experimentell inriktning) samt denna tjänst inom Fordonssystemteknik där den som får tjänsten förväntas arbeta i nära samverkan med de andra forskarna inom TRENoP. Sökanden förväntas alltså bidra i tvärvetenskapliga forsknings- och utbildningssamarbeten med andra forskningsgrupper som deltar i det strategiska forskningsområdet inom transport.

Under de senaste åren har Mastersprogrammet i Fordonsteknik antagit ca 30 studenter per år. Av dessa är ca 30 % KTH-studenter och övriga 70 % är internationella mastersstudenter. Av de externa mastersstudenterna är närmare 80 % avgiftsskyldiga studenter. Utöver dessa studenter tillkommer det ett fåtal dubbeldiplomstudenter (ca 1-5 st/år) som läser kurser relaterat till programmet.

Ansökningsstatistiken visar att programmet är eftertraktat bland internationella mastersstudenter, där både totala antalet sökande och förstahandssökande per år har stigit kontinuerligt under senaste åren. Antalet förstahandssökande per antagningsplats har gått upp från ca 2,5 per plats under 2015-2016 till 5 sökande per plats under 2017.

År 2017 var det totalt 605 sökande till programmet varav 213 var förstahandssökande och de preliminära siffrorna för 2018 visar på en fortsatt ökning, till totalt 726 sökande, varav 312 förstahandssökande.

Motivering

Den sökande förväntas ha förmåga att kunna genomföra utbildning av hög kvalitet på alla nivåer inom grundläggande ämnen för markfordon (både på väg och spår) såsom fordonsteknik, fordonsdynamik, fordons aerodynamik, fordonssystemteknik mm. Av betydelse är även graden av intresse och förmåga till pedagogiskt utvecklings- och förnyelsearbete. Speciellt ansvar förväntas för kursen SD2221 Fordonssystemteknik på 7.5 hp för cirka 40-50 studenter per år.

Forskargruppen är idag en viktig del inom KTHs Transportplattform (vice föreståndare, senior rådgivare), inom en mängd forskningscentra såsom Vinn Excellence Centre Vehicle Design (föreståndare), ITRL (vice föreståndare), Swedish Electromobility Centre (KTH representant för Tema 1) och Järnvägsgruppen (Föreståndare). Gruppen innehåller också de fakultetsansvariga inom de strategiska partnerskapen mellan KTH-Bombardier samt KTH-Scania. Dessutom är avdelningens fakultet Prefekt för Institutionen för Farkost & Flyg, Vicerektor för forskning samt ansvarig för Mastersprogrammet inom Fordonsteknik. Detta innebär att gruppen behöver förstärkas både inom forskning och utbildning.

Framtidens fordonsteknik på KTH måste byggas utifrån en väl grundad förståelse för fordonens uppbyggnad och egenskaper, inkluderande fordonssystemens tekniska lösningar, dess dynamiska beteende och samspelet med omgivande infrastruktur och trafiksystem. Av högsta betydelse är att den sökande kan bedriva forskning på hög internationell nivå inom ämnet för tjänsten, dokumenterad genom publikationer i internationella vetenskapliga tidskrifter. Sökande med en forskningsprofil som kompletterar och breddar forskningsverksamheten som redan etablerats vid KTH kommer att prioriteras. Möjliga sådana profiler (men inte begränsade till) kan vara fordonssystemteknik för autonoma fordon, AI för fordonsanpassning, elektrifierade fordon etc.

Bifogat finns ett förslag på ämnesbeskrivning av den nya tilltänkta tjänsten. Finansieringen planeras för de första 5 åren ske genom den strategiska satsningen TRENoP (1 mkr/år) samt Fakir. På sikt förväntas forskaren att vara delaktig i verksamhetens olika forskningssatsningar samt att på egen hand söka externa medel.

Analysen av programdata visar att andelen kvinnor som börjar på Mastersprogrammet generellt sett är låg. I den senaste antagningen (HT17) var andelen kvinnor på programmet ca 12 %, vilket i princip är i samma storleksordning som den andel kvinnor som söker till civilingenjörsprogrammet Farkostteknik (2014-2017, ca 13%). Även andelen kvinnor bland de externa sökande till programmet är låg. På forskargruppen finns idag 2 kvinnliga professorer (en tjänstledig) och en kvinnlig lektor av totalt 4 professorer, 4 lektorer och en biträdande lektor. Vi har i dagsläget identifierat tre kvinnliga potentiella sökande till biträdande lektoratet samt hoppas att flera kommer att söka då tjänsten annonseras ut. Vi avser att annonsera tjänsten brett via alla kanaler vi har tillgängliga. Vi kommer att jobba aktivt för att få kvinnliga sökande till tjänsten.

KTH 2018-04-24

Sebastian Stichel	Lars Drugge
Prefekt	Enhetsledare och PA Vehicle Engineering

Anställningsprofil för biträdande lektor i fordonssystemteknik

Ämnesområde

Fordonsteknik

Ämnesbeskrivning

Fordonsteknik

Arbetsuppgifter

Innehavaren av tjänsten förväntas forska samt undervisa grundläggande kurser inom ämnet såsom fordonsteknik, fordonsdynamik, fordonssystemteknik samt fordonsaerodynamik.

Innehavaren av tjänsten förväntas skapa nya nätverk inom och utom KTH, aktivt ansöka om forskningsfinansiering och på sikt utveckla kurser på såväl grund-, avancerad- som forskarnivå. Den sökande ska bidra till utvecklingen av institutionens utbildningsprogram samt handleda examensarbeten inom ämnesområdet.

Den biträdande lektorn kommer att ges möjlighet att utveckla sin självständighet som forskare och få meriter som kan ge behörighet för en annan läraranställning som det ställs högre krav på behörighet för (se 4 kap. 12 a § högskoleförordningen). Den biträdande lektorn ska efter ansökan prövas för en befordran till lektor.

Behörighet

Behörig att anställas är den som har avlagt doktorsexamen eller har uppnått motsvarande vetenskaplig kompetens. Främst bör den komma i fråga som har avlagt doktorsexamen eller har nått motsvarande kompetens högst sju år före ansökningstidens utgång.

Bedömningsgrunder

Som bedömningsgrunder vid anställning som biträdande lektor vid KTH gäller de bedömningsgrunder som anges i KTH:s anställningsordning, bilaga 3, i förhållande till fastställd anställningsprofil.

Av högsta betydelse är att den sökande kan bedriva forskning på hög internationell nivå inom ämnet för tjänsten, dokumenterad genom publikationer i internationella vetenskapliga tidskrifter. Sökanden förväntas delta i tvärvetenskapliga forsknings- och utbildningssamarbeten med andra forskningsgrupper som deltar i det strategiska forskningsområdet inom transport. Sökande med en forskningsprofil som kompletterar och breddar forskningsverksamheten som redan etablerats vid KTH kommer att prioriteras. Möjliga sådana profiler (men inte begränsade till) kan vara fordonssystemteknik för autonoma fordon, AI för fordonsanpassning, systemteknik för elektrifierade fordon etc.

Av näst högsta betydelse är att den sökande har förmåga att kunna genomföra utbildning av hög kvalitet på alla nivåer inom grundläggande ämnen för markfordon (både på väg och spår) såsom fordonsteknik, fordonsdynamik, fordons aerodynamik, fordonssystemteknik mm. Av näst högsta betydelse är även graden av intresse och förmåga till pedagogiskt utvecklings- och förnyelsearbete.

Av betydelse är en postdoktorsvistelse i annan forskningsmiljö än det lärosäte den sökande disputerat vid. I tillämpningsnära områden kan erfarenhet från forsknings- och utvecklingsarbete inom industrin eller andra organisationer bedömas motsvara en traditionell postdoktorsvistelse vid ett annat lärosäte. Även den sökandes förmåga att etablera och utveckla samarbeten inom forskning och utbildning är av betydelse

liksom den sökandes potential till utveckling på lång sikt. Av betydelse är likaså den sökandes intresse för och insikter rörande ledarskap i akademin, samverkan med det omgivande samhället, samt medvetenhet om mångfalds- och likabehandlingsfrågor med särskilt fokus på jämställdhet. Dessutom är administrativ skicklighet av betydelse.

Särskilda bedömningsgrunder för befordran till lektor

Vid prövning av ansökan om befordran till lektor kommer den sökandes förmåga att självständigt initiera och driva forskning av hög vetenskaplig kvalitet, publicerad i internationella tidskrifter och konferensvolymer samt sökandes förmåga att erhålla finansiering av forskningsverksamhet att bedömas. Av högsta betydelse är den sökandes förmåga att självständigt etablera nya samarbeten och forskningsinriktningar. Av högsta betydelse är även att den sökande har visat skicklighet i undervisning samt handledning.

Assistant professor in Vehicle System Engineering (tenure track)

Subject area

Vehicle Engineering

Subject description

Vehicle Engineering

Duties

The successful applicant is expected to do research and teach fundamental courses within the subject, such as vehicle engineering, vehicle dynamics, vehicle system engineering, vehicle aerodynamics, etc.

The applicant should have the potential to create new networks within and outside KTH, actively apply for research funding and eventually develop courses both at undergraduate and graduate levels. The applicant is also expected to contribute to the department's educational programs and supervise M.Sc.-projects within the subject area.

The assistant professor will be given opportunity to develop their independence as researcher and gain accreditation that may allow them to take other teaching positions with higher eligibility requirements (see Chapter 4, Section 12 a of the Higher Education Ordinance). Following application, the assistant professor shall be assessed for promotion to associate professor.

Eligibility

A person is eligible for appointment if they have attained a Degree of Doctor or have the equivalent academic expertise. Primarily, persons should have attained a Degree of Doctor or have acquired the equivalent expertise no more than seven years before the end of the application period.

Grounds of assessment

Of highest importance is the applicant's ability to perform research on high international level within the subject area, documented by publications in international peer-reviewed journals. The applicant is expected to promote interdisciplinary research and educational collaborations with other research groups participating in the transport strategic research area. The applicant's ability to establish and develop cooperations within education and research will be a criteria of assessment. Applicants with a research profile that complements and widens the research activities already established at KTH will be given priority. Possible such profiles (but not limited to) could be vehicle system technologies for autonomous vehicles, AI for vehicle adaption, vehicle system technologies for electrified vehicles, etc.

Of second highest importance is that the applicant has pedagogical skills to perform high quality education on both undergraduate and graduate levels within ground vehicles (both on road and track) in subjects such as vehicle engineering, vehicle dynamics, vehicle system engineering, vehicle aerodynamics, etc. *Of second highest importance* is also the interest and ability for pedagogical development and renewal.

It is also important that a person who is appointed as assistant professor at KTH has experience from research environments other than KTH, equivalent to a post-doctorate period or doctorate degree from another institution. In more practical areas, experience from industry can be just as valuable as a traditional post-doctoral residency at another university. The applicant's ability to establish and develop cooperation within research and education *is also important* as is the applicant's long-term development potential. Likewise *important* is the applicant's ability to collaborate with the surrounding society and to disseminate information regarding research and development work. In addition, the applicant's expertise in developing and leading activities and personnel *is important*; this includes having knowledge about matters of diversity and equal treatment, with particular focus on gender equality.

Special grounds of assessment for promotion to associate professor

When assessing applications for promotion to associate professor, the applicant's ability to independently initiate and carry out research of high academic quality, published in international publications, and the applicant's ability to obtain financing for research operations will be assessed. *Of highest importance* is the applicant's ability to independently establish new collaborations and research specializations. *Of highest importance* is also that the applicant's has displayed expertise in teaching and supervision.

Anställningsprofil för lektor i matematik med inriktning mot modelldriven maskininlärning

Ämnesområde
Matematik med inriktning mot modelldriven maskininlärning

Ämnesbeskrivning
Matematik som omfattar utvecklandet av teori och algoritmer som använder maskininlärning kombinerat med matematisk analys och matematisk statistik för att lösa storskaliga illa ställda inversa problem. Teorin och algoritmerna skall vara av fundamental matematisk natur, men motiveras av tillämpningar på framförallt storskalig experimentell data, som till exempel bildrekonstruktion.

Arbetsuppgifter
Utveckling av verksamhet inom modelldriven maskininlärning och uppbyggnad av en egen forskargrupp. Forskning och utbildning såväl som administrativa uppgifter. Bidra till utvecklandet av utbildningsprogram och kurser på både grundnivå och avancerad nivå. Handledning av forskarstuderande och examensarbeten, ofta i samarbete med företag. I arbetsuppgifterna ingår även att ta ett stort ansvar för kontakter mellan matematikinstitutionen och forskare inom mer tillämpade områden samt avnämare. Om den som anställs på tjänsten inte kan svenska, förväntas hen kunna undervisa på svenska inom två år.

Behörighet
Behörig att anställas som lektor är den som har:
1. avlagt doktorsexamen eller har motsvarande vetenskaplig kompetens eller någon annan yrkesskicklighet som är av betydelse med hänsyn till anställningens ämnesinnehåll och de arbetsuppgifter som ska ingå i anställningen, och
2. visat pedagogisk skicklighet.

Bedömningsgrunder
Som bedömningsgrunder vid anställning som lektor vid KTH ska graden av sådan skicklighet som är ett krav för behörighet för anställning gälla. Därutöver gäller de bedömningsgrunder som anges i KTH:s anställningsordning, bilaga 2, i förhållande till fastställd anställningsprofil.

Det är av *högsta betydelse* att den sökande har
-vetenskaplig skicklighet inom ämnesområdet
-pedagogisk skicklighet inom ämnesområdet
-stor erfarenhet av framgångsrikt samarbete med forskare och avnämare utanför matematiken

Det är av *näst högsta betydelse* att den sökande har
-stor erfarenhet av att administrera forskning och leda forskningsprojekt

Det är *även av betydelse* att den sökande har
-förmåga att samverka med det omgivande samhället och informera om forskning och utvecklingsarbete.
-skicklighet att utveckla och leda verksamhet och personal, i vilken ingår kunskap om mångfalds- och likabehandlingsfrågor med särskild fokus på jämställdhet.
-administrativ skicklighet och annan skicklighet som är av betydelse

-samarbetsförmåga

Förslag på inrättande av ett lektorat i matematik med inriktning mot modelldriven maskininlärning

1 Motivering

Förmågan att analysera och extrahera information ur komplexa data är en central del av digitaliseringen i samhället och det gäller i synnerhet inom bildrekonstruktion. Det finns just nu ett stort intresse av att förstå och vidareutveckla de matematiska grunderna för maskininlärning, vilket är det vi avser med modelldriven maskininlärning. Likväl finns ett stort intresse för att hantera data om bilder. Inom Stockholm konkretiseras detta med inrättandet av Brummer & Partners MathDataLab på KTH matematik och nyligen fick initiativet Wallenberg Autonomous Systems and Software Program (WASP), där KTH ingår, ca en miljard kronor från Knut och Alice Wallenbergs stiftelse (KAW) för en satsning på nästa generations maskininlärning samt för att öka förståelsen för matematiken bakom maskininlärning.

MedTechLabs, ett nyligen inrättat SLL centrum på KTH, har lanserat "medicinsk bildvetenskap" som sitt första vetenskapliga program med tydliga kopplingar till maskininlärning. Dessutom har bild analys och bildrekonstruktion en central roll i många forskningsämnen och stora internationella satsningar som SciLifeLab (Cell och Humana Protein Atlasen) och MaxLab IV.

Ett viktigt utmaning är att matematiskt karakterisera problem som passar en given inlärningsarkitektur, ett annat är att förstå inlärningsegenskaper hos en given arkitektur och den a priori information som dessa kan inkorporera. Av central vikt är att beskriva kopplingen till analys av stora data mängder Lösning av inversa problem utgör här en viktig del i denna process. Utöver tillämpningar inom biomedicinsk bildåtergivning kan metoderna med fördel anpassas till att lösa flera andra problem inom signalbehandling och ingenjörsvetenskapliga tillämpningar kopplat till den fjärde industriella revolutionen (Industri 4.0). Ett viktigt bidrag ur ett hållbarhetsperspektiv av ämnesområdet är en klart bättre beräkning och förståelse av risker i tekniska, ekonomiska och biologiska system.

Nuvarande status inom institutionen Analys och metodutveckling för modelldriven maskininlärning och dess tillämpning kombinerar olika områden från matematiken, såsom signalbehandling, matematisk analys, optimering, numeriska metoder och matematisk statistik. Nya teorier och analysverktyg behöver tas fram för att modellera, klassificera och studera hur träningsdata och explicita modeller samverkar i maskininlärning och nyttja den moderna utvecklingen av datorkraft i algoritmerna. Inriktningen kombinerar flera områden där svensk

matematik, och KTH i synnerhet, har gott anseende, såsom numerisk harmonisk analys, optimering, matematisk analys, matematisk statistik, och modellering av komplexa fysikaliska system.

Ovanstående ställer även allt större krav och förväntningar på den moderna ingenjörsutbildningen. Avdelningen för matematik utvecklar och ger grund- och avancerade kurser inom de flesta matematiska områdena, flera med relevans för tillämpad matematik och matematisk statistik. Vidare finns det stor efterfrågan på kurser inom dataanalys, exempelvis har avdelningen för matematisk statistik under 2018–2019 ca 50 examensarbetare inom maskininlärning. Det finns nu flera kurser (SF2935, SF2957 och SF2956) inom avdelning Matematisk Statistik och Matematik som täcker metoder för oövervakad respektive övervakad inlärning. Båda avdelningarna har dessutom etablerade samarbeten med enheter inom och utanför KTH, både på forskning och utbildnings nivå.

Under 2019 kommer en av professorerna på avdelning matematisk statistik med expertis inom statistisk inlärning, Timo Koski, att gå i pension. Givet det växande intresset bland studenter är avdelning matematisk statistik i stort behov av att rekrytera en person med en profilering mot maskininlärning.

Sammanfattningsvis saknas lärarkapacitet inom institutionen för att möta den alltmer ökande efterfrågan på undervisningsinitiativ inom tillämpad analys och dess koppling till maskininlärning. Institutionen för matematik på KTH behöver därför rekrytera en person med en forskningsprofil som kombinerar expertis inom modellering med maskininlärning och tjänsten placeras lämpligtvis på båda avdelningarna med tanke på ämnets karaktär.

Rekryteringsnämnden bestående av Boualem Djehiche (sammankallande), Svante Linusson och Sandra Di Rocco har genom institutionens medlemmars internationella kontakter och nätverk identifierat sex potentiella sökande till tjänsten (se listan nedan). Rekryteringsnämnden har särskilt strävat efter att identifiera kvinnliga potentiella sökande. Hittills har institutionen för matematik varit lyckosam i rekrytering av kvinnliga medarbetare och det är nämndens förhoppning att vi fortsätter attrahera starka kvinnliga kandidater.

Potentiella sökande till lektorat (i alfabetisk ordning) är:

- Nina Balcan (Carnegie Mellon University)
- Marta Betcke (UCL)
- Martin Benning (University of Cambridge)
- Jan-F. Pietschmann (University of Münster)
- Caroline Uhler (MIT)
- Ozan Öktem (KTH)

Möjliga sakkunniga skulle kunna vara:

- Martin Burger (University of Münster) (man)
- Gitta Kutyniok (TU Berlin) (kvinna)
- Peter Maass (University of Bremen) (man)
- Thomas Pock (TU Graz) (man)

- Carola-Bibiane Schönlieb (University of Cambridge) (kvinna)
- Gabriele Steidl (Technische Universität Kaiserslautern) (kvinna)

Vi planerar att annonsera via de kanaler som normalt används för tjänster inom området. Speciellt via The International Statistical Institute, SIAM och AMS.

2 Planering av basfinansiering och arbetsuppgifter för de första fem åren

Översiktliga intäkter för institutionen för matematik framgår av den bifogade planen för strategisk fakultetsutveckling. Specifik planering för basfinansiering och arbetsuppgifter för den specifika tjänsten under de fem första åren ges i tabellerna nedan. Tabellen visar kostnaden för en lektor fördelat på olika kostnadsslag i tkr inklusive OH. Ambitionen är att lektorn har ca 50% undervisning. Den exakta fördelningen mellan undervisning och forskning kan komma att bero på den faktiska tillgången på fakultets- respektive externa medel under femårsperioden. Lektorn förväntas söka externa medel för att finansiera dels sin forskning och dels en doktorandtjänst.

	År 1	*År 2*	*År 3*	*År 4*	*År 5*
Grundutbildningsmedel	750	750	750	750	750
Befintliga fakultetsmedel	450	450	450	450	450
Externa medel			300	300	300
Strategiska fakultetsmedel	300	300			
Summa	1500	1500	1500	1500	1500

Tab. 1: Översikt av basfinansiering under de fem första åren. Posten ”Strategiska fakultetsmedel” avser institutionens centrala fakultetsmedel som finansierar en del av forskningstiden under de första två åren då personen ifråga söker extern finansiering.

	År 1	*År 2*	*År 3*	*År 4*	*År 5*
Utbildning på grund- och avancerad nivå	50%	50%	50%	50%	50%
Utbildning på forskarnivå och forskning	50%	50%	50%	50%	50%
Summa	100%	100%	100%	100%	100%

Tab. 2: Översikt av planerade arbetsuppgifter för en lektor de fem första åren.

3 Planering för perioden 5–10 år efter anställning

Som motiverats i första avsnittet förutspår vi att ämnet kommer vara fortsatt attraktivt inom såväl forskning som undervisning. Vi förutser därför att det

finns utrymmer för finansiering av tjänsten med befintliga basmedel även från år sex och framåt. Detta beror dock till viss del på fördelningen av forskning och undervisning inom tjänsten. Finansiering av forskning kan till viss del kräva externa anslag, särskilt för anställning av doktorander och för att bygga och upprätthålla en forskningsgrupp.

4 Startpaket vid nyanställning på fakultetsanställning

På skolan för teknikvetenskap används startpaket strategiskt och är föremål för förhandling. Det finns möjligheter till speciella startbidrag på skolnivå, men dessa tilldelas normalt inte vid utlysning av tjänst utan i förekommande fall vid tillsättningen av tjänsten.