

# Material for the *Annual Report 2018*

Christer Oscar Kiselman

## 1. Writings

### 1.1. Five publications (registered in DiVA)

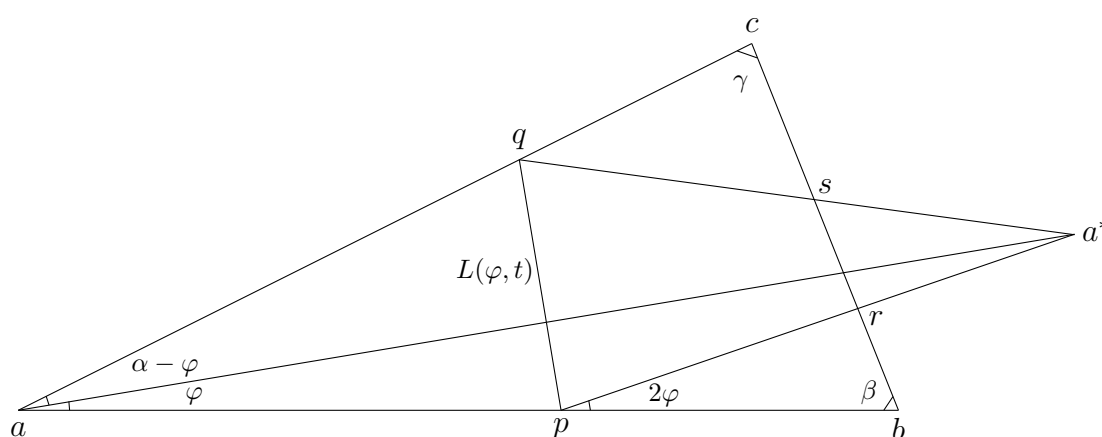
During 2018, five publications have appeared with me as an author.

**18-i.** *An introduction to a book:*

Enkonduko [Introduction]. **In:** Kiselman, Christer Oscar; Corsetti, Renato; Dasgupta, Probal, Eds. 2018. *Aliroj al esperanto*, pp. 5–8. Dobřichovice: KAVA-PECH, 229 pp. ISBN 978-80-87169-86-5. Published in January 2018.

**18-1.** *A scientific article published in print (earlier published online):*

How to best fold a triangle. *Mathematische Semesterberichte* **65** (2018), Issue 1, 65–89. (Print version of 17-3.) Reviewed in *MathSciNet*: MR3763960, September 2018.



*Figure 1.1.* (From publication 18-1.) The original triangle  $T(a, b, c)$  has its vertices at  $a$ ,  $b$  and  $c$ . We fold it along a line, denoted by  $L(\varphi, t)$ . The folded object is a heptagon with vertices at  $p$ ,  $b$ ,  $r$ ,  $a^*$ ,  $s$ ,  $c$ ,  $q$ , where  $a^*$  is the reflection of  $a$  in the line  $L(\varphi, t)$ . The doubly covered set is a quadrilateral  $Q(p, r, s, q)$  with vertices at  $p$ ,  $r$ ,  $s$ ,  $q$ .

**18-2.** *Lecture notes:*

*Digita geometrio, matematika morfologio kaj diskreta optimumado* (69 pp.) The notes were published online at the web site [www.ais-sanmarino.org](http://www.ais-sanmarino.org) on 2018 March 05, following a course held in Warsaw in September 2017 during the 34<sup>th</sup> University Session of the International Academy of Sciences San Marino (AIS).

**18-ii.** *Introduction in Esperanto to an issue of a journal:*

Salutvorto de la redaktoro. 2018. *Esperantologio / Esperanto Studies*, **8**, 3–7.

**18-iii.** *Introduction in English to an issue of a journal:*

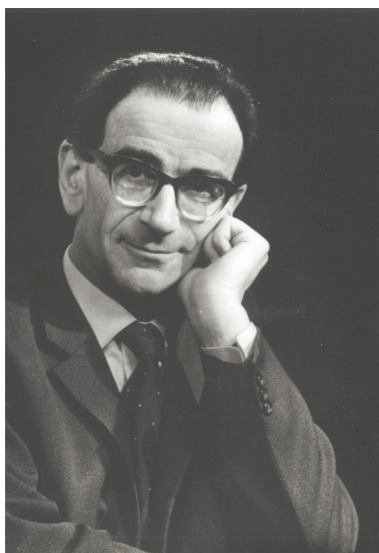
A word from the Editor. 2018. *Esperantologio / Esperanto Studies*, **8**, 8–12.

**1.2. Three papers accepted for publication (registered in DiVA)****1.2.1. Language choice in scientific writing: The case of mathematics at Uppsala University and in a Nordic journal**

Accepted in 2016 for publication in *Normat*, volume **61**, No. 2. Not yet published as of 2019 January 25.

**1.2.2. Werner Fenchel, a pioneer in convexity theory and a migrant scientist**

Accepted in 2016 for publication in *Normat*, volume **61**, No. 2. Not yet published as of 2019 January 25.



*Figure 1.2.* (Manuscript 1.2.2.) Werner Fenchel (1905–1988).

**1.2.3. Akademio de Esperanto fronte al novaj taskoj**

Manuscript based on a presentation during the Conference on Esperanto Studies in Buenos Aires on 2014 July 31, organized by Esther H. Schor and José Antonio Vergara. Accepted to appear in: “*Esenco kaj Estonteco*”: *Lingvoscienco, Tradukado*

*kaj Komunumo. Aktoj de la 37-a Esperantologia Konferenco en la 99-a Universala Kongreso de Esperanto, Bonaero 2014*, pp.23–32. Editors: José Antonio Vergara and Esther Schoor. Not yet published as of 2019 January 25.

### 1.3. A submitted manuscript

- 2018 September 29. Generalized convexity: The case of lineally convex Hartogs domains (24 pp.).

### 1.4. Editorial work

**1.4.1.** Editor, together with Renato Corsetti and Probal Dasgupta, of a book entitled *Aliroj al esperanto*, 229 pp., published in 2018. ISBN 978-80-87169-86-5. See also Subsection 1.1, item 18-i. The book contains fourteen chapters written by outstanding Esperantists. Published in January 2018.

*Period:* 2015–2018.

**1.4.2.** Editor, *Esperantologio / Esperanto Studies*, Issue No. **8**, published in April 2018 (print) and in December 2018 (online). See also Subsection 1.1, items 18-ii and 18-iii.

*Period:* 2015–2018.

## 2. Memberships in academies

Royal Academy of Arts and Sciences, Uppsala	1983–date
Royal Society of Sciences, Uppsala	1984–date
International Academy of Sciences, San Marino (AIS)	1984–date
<i>Internacia Scienca Akademio Comenius</i>	1986–date
[Esperanto Academy	1989–2015-12-15]
Royal Swedish Academy of Sciences	1990–date
<i>Polska Akademia Umiejętności</i> (Polish Academy of Arts and Sciences)	2002–date
Confirmed by the President of the Republic of Poland on	2002 July 12
The diploma handed over by the Ambassador of Poland to Sweden, Marek Prawda, on	2003 June 10

## 3. Memberships in learned societies

Swedish Astronomical Society (Life member)	1954–date
Swedish Mathematical Society (Life member)	1960s–date
American Mathematical Society (Life member)	1966–date
Société Mathématique de France	1960s–date
European Mathematical Society	1990s–date

Uppsala Humanistiska Förbund  
 (The Uppsala Union for the Humanities) 1990s–date  
 Scandinavian Society for Iranian Studies (Associate member) 2010–date

## 4. Organization of meetings

- 4.1.** *Analysis Day in Memory of Mikael Passare*, at Stockholm University on September 19, organized by Pavel Kurasov, Mats Andersson, and me. Five lectures.
- 4.2.** Michael Breuß (Cottbus), Alfred M. Bruckstein (Haifa), Petros Maragos (Athens), and me applied in October 2017 to organize a Dagstuhl Seminar on *Shape Analysis: Euclidean, Discrete, and Algebraic Geometric Methods*. Our application was approved on 2018 January 26.

The seminar took place October 14–19 at Sloß Dagstuhl in Saarland with 26 lectures and 24 very short presentations (biosketches).

## 5. Four invited talks

### 5.1. Fest Seminar, February 23, Uppsala University

On February 23, there was a *Fest Seminar in honor of Gunilla Borgefors*, organized on the occasion of her retirement. I was one of six invited speakers. My title was “Gunilla Borgefors . . . Decades of Friendship.”

### 5.2. Forum for Jewish Studies and the Department of Philology and Linguistics

On February 28, I was invited by Lars M. Andersson to give a talk at the joint seminar of the Forum for Jewish Studies and the Department of Philology and Linguistics at Uppsala University. My title was “Zamenhof’s Yiddish grammar and his five constructed languages.”

### 5.3. 103<sup>rd</sup> World Congress of Esperanto, July 28 – August 04

At the invitation of Sara Spanò I gave a presentation of some publications of mine in Lisbon on July 30, 16:00–16:30.

### 5.4. Shape Analysis: Euclidean, Discrete, and Algebraic Geometric Methods, October 14–19

I gave a presentation at Sloß Dagstuhl with the title “Duality of convolution operators: A tool for shape analysis?” on October 16.



## 6. Prize

I received the *Germain Pirlot Prize* of the International Academy of Sciences in the category *Courses* (one of two prizes for the six years 2013–2018). The course in question is mentioned above in Subsection 1.1, item 18-2. The decision was announced at the *103<sup>rd</sup> World Congress of Esperanto* in Lisbon on 2018 August 03.

## 7. Commissions

### 7.1. The Board of the Center for Research and Documentation on World Language Problems

I was a member of the Board of the Center for Research and Documentation on World Language Problems (CED) for the years 2013–2016 and was then appointed for a new period from 2016 until July 2019. I resigned from the board effective 2018 December 31.

### 7.2. Dean at the International Academy of Sciences

I am appointed as Dean of the Faculty of Structural Sciences of the International Academy of Sciences, 2017 July 28 [until 2019 December 31].

## 8. Participation in conferences without giving a talk

During 2018, I have participated in seven conferences without giving a talk:

- 8.1. *Second Network Meeting for Sida- and ISP-funded PhD Students in Mathematics*, organized by Linköping University, Uppsala University, and the Swedish International Development Cooperation Agency (Sida), and held at the Sida Headquarters in Stockholm, February 26 and 27.
- 8.2. *oyf jidish klingt es beser* [It sounds better in Yiddish], a conference with six lectures and music at the Royal College of Music in Stockholm, March 04.
- 8.3. *Workshop on Language Contact*, organized at Uppsala University by Anju Saxena, June 01. Twelve lectures.
- 8.4. *Oral Narration in Iranian Cultures. A conference in honour of Professor Bo Utas on his 80th Birthday*, organized at Uppsala University by Carina Jahani, June 07–09. Nineteen lectures.
- 8.5. *Nitobe Seminar* held in Lisbon, August 04–05, organized by Javier Alcalde. Six lectures and five debates.
- 8.6. *Analysis Day in Memory of Mikael Passare* held at Stockholm University on 2018 September 19. Five lectures.
- 8.7. *Neo-Aramaic Languages across Space and Time*, held at Uppsala University, 2018 October 05–07, organized by Eleanor Coghill. (I participated only in a part of it.)

## 9. Visitor

### 9.1. Fanja Rakotondrajao



*Figure 9.1.* Fanja Rakotondrajao in Livingstone, 2017 October 12.

Fanja Rakotondrajao, Professor of Mathematics at Université d’Antananarivo, President of the Mathematical Society of Madagascar, and member of the Malagasy Academy, visited Sweden, in particular Uppsala University and its IT-department, during February 14–28. We worked together on Project 10.8 and wrote on a paper with the title “Principles of mathematical terminology.” For more details, see Project 10.8.

Fanja was an invited speaker at the *Second Network Meeting for Sida- and ISP-funded PhD Students in Mathematics*, organized by Linköping University, Uppsala University, and the Swedish International Development Cooperation Agency (Sida), and held at the Sida Headquarters in Stockholm, February 26 and 27. The title of her presentation was “What we learn, what we get to know.”

### 9.2. Fabrizio Angelo Pennacchietti

Fabrizio Angelo Pennacchietti, Professor of Semitic Philology at Università di Torino, Dipartimento di Studi Umanistici, visited Uppsala University in October 2018. He participated as an invited speaker in the conference *Neo-Aramaic Languages across Space and Time*, held at Uppsala University, 2018 October 05–07, and organized by Eleanor Coghill.

Several friends and colleagues had discussions with him on many aspects of linguistics.

## 10. Eight current research projects

### ★ Good problems

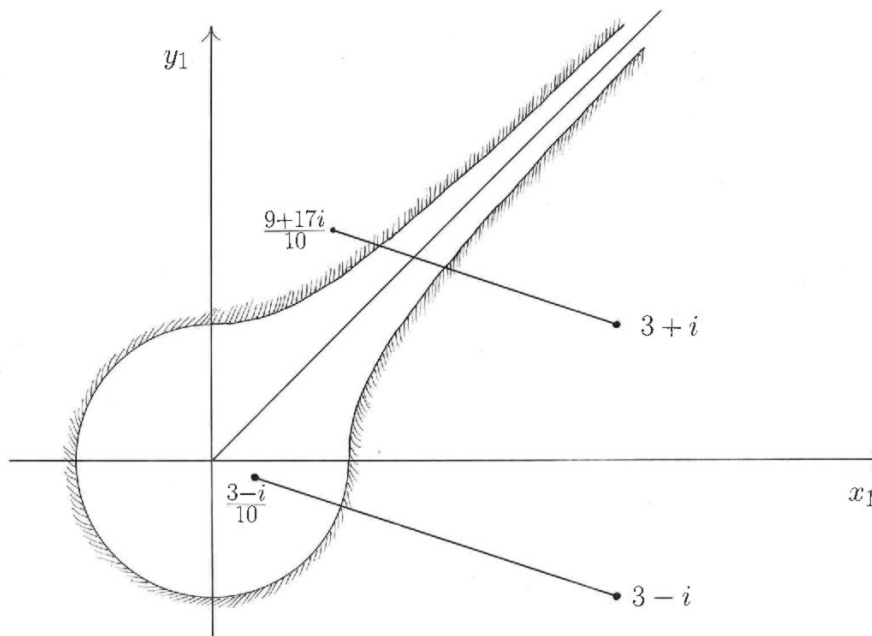
Problems worthy  
of attack  
prove their worth  
by hitting back  
(Piet Hein)

### ★ An explanation ... or is it an excuse?

The primates are notable by reason of their activity and restlessness, and especially because of their curious concern with what goes on around them.

(Colbert, Edwin H. 1966, p. 272. *Evolution of the Vertebrates: A History of the Backboned Animals Through Time*. New York: John Wiley & Sons, Inc.)

### 10.1. Complex convexity



*Figure 10.1.* (Project 10.1.) The base in the complex plane of a locally lineally convex set in  $\mathbf{C}^2$  which is not lineally convex (from publication 16-1; courtesy Hania Uscka-Wehlou).

*Project manager:* Christer Oscar Kiselman.

*Project description:* A bounded open set with boundary of class  $C^1$  which is locally weakly lineally convex is weakly lineally convex, but, as shown by Yuriĭ Zelinskiĭ, this need not be true for unbounded domains. We construct explicit examples, Hartogs domains, showing this. Their boundary can have regularity  $C^{1,1}$  or  $C^\infty$ .

Obstructions to constructing smoothly bounded domains with certain homogeneity properties are presented.

A current activity is a study of one-sided regularity of subsets of  $\mathbf{R}^n$  or  $\mathbf{C}^n$ . Preliminary results on this kind of regularity were presented at a conference at Stockholm University on 2015 September 16.

*Period:* 1967-10-01 — .

*Advisors:* Jan Boman, Ragnar Sigurdsson, and Mats Andersson.

*Financed by:*

- (1) Université de Nice 1967-10-01 — 1968-09-30;
- (2) Uppsala University 1968-10-01 — 2006-04-30;
- (3) Kingdom of Sweden 2006-05-01 — .

*Publications:* There are several publications in this project. The latest publication appeared in March 2016 (16-1).

A manuscript was submitted in September 2018 and is now under consideration for possible publication in Poland—see Subsection 1.3.

## 10.2. Elements of Digital Geometry, Mathematical Morphology, and Discrete Optimization

*Project manager:* Christer Oscar Kiselman.

*Project description:* A book on fundamentals of three related fields of knowledge: digital geometry, mathematical morphology, and discrete optimization.

*Partners:* Hania Uscka-Wehlou, Shiva Samieinia, Adama Arouna Koné; possibly others.

*Period:* 2002 — .

*Financed by:* Christer Oscar Kiselman:

- (1) Uppsala University 2002 — 2006-04-30;
- (2) Kingdom of Sweden 2006-05-01 — .

Hania Uscka-Wehlou:

- (1) Man In The Middle AB (MITM);
- (2) Uppsala University 2017 August 15 — 2019 August 13.

Shiva Samieinia:

- (1) The Royal Institute of Technology;
- (2) Stockholm University;
- (3) The Ruth and Nils-Erik Stenbäck Foundation.

Adama Arouna Koné:

- (1) International Science Programme (ISP) 2011–2016;
- (2) Université des Sciences, des Techniques et des Technologies de Bamako (USTTB), Bamako I, 2011 — 2018 January 07;
- (3) École Normale d'Enseignement Technique et Professionnel (ENETP), 2018 January 08 — .

*Publication:* Lecture notes from 2002 (78 pages) and 2004 (95 pages) are available on my web site.

Lecture notes with the title *Digita geometrio, matematika morfologio kaj diskreta optimumado* (69 pp.) from a course held in Warsaw in September 2017 (see Subsection 1.1). Published at the web site of the International Academy of Sciences (AIS). See also Section 6.

A book manuscript, now comprising 379 pages, is being written.

### 10.3. Existence of continuous right inverses to linear mappings in elementary geometry

*Project manager:* Christer Oscar Kiselman.

*Project description:* A linear mapping of a compact convex subset of a finite-dimensional vector space always possesses a right inverse, but may lack a continuous right inverse even if the set is smoothly bounded. Examples showing this are given as well as conditions guaranteeing the existence of a continuous right inverse, also for other sets.

*Period:* 2005-09-08 — .

*Partner:* Erik Melin; possibly others.

*Advisor:* Hiroshi Yamaguchi.

*Financed by:* Christer Oscar Kiselman:

(1) Uppsala University 2005 — 2006-04-30;

(2) Kingdom of Sweden 2006-05-01 — .

Erik Melin: Uppsala University 2005–2008.

*Publication:* A manuscript is in preparation.

### 10.4. Convexity of marginal functions in the discrete case



*Figure 10.2.* (Project 10.4.) Shiva Samieinia.

*Project manager:* Christer Oscar Kiselman.

*Project description:* We define, using difference operators, classes of functions defined on the set of points with integer coordinates which are preserved under the formation of marginal functions.

The duality between classes of functions with certain convexity properties and families of second-order difference operators plays an important role and is explained using notions from mathematical morphology.

Several generalizations are now being studied.

*Period:* 2010-01-11 — .

*Partner:* Shiva Samieinia.

*Financed by:* Christer Oscar Kiselman: Kingdom of Sweden.

Shiva Samieinia:

- (1) The Royal Institute of Technology;
- (2) Stockholm University;
- (3) The Ruth and Nils-Erik Stenbäck Foundation.

*Publications:* An article (10-4), joint with Shiva, was published as a part of her PhD thesis. A joint paper (17-5, mentioned in the report for 2017) was published in September 2017. Part of the results will be covered by the book manuscript mentioned in Subsection 10.2.

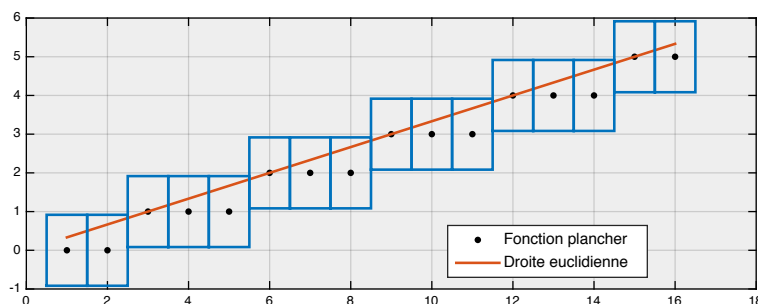
## 10.5. Digital hyperplanes

*Project manager:* Christer Oscar Kiselman.

*Project description:* Digital planes in all dimensions are studied. The general goal is to generalize to any dimension the results of Kiselman's 2011 paper in *Mathematika* (11-1).

An important part of the study was finished with Adama Arouna Koné's thesis, presented on 2016 January 14. There are, however, several possible generalizations which are now being investigated.

*Period:* 2010-01-11 — .



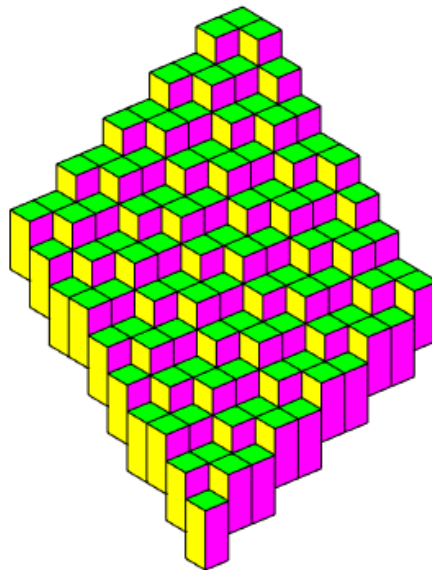
*Figure 10.3.* (Project 10.5.) Covering the Euclidean straight line of equation  $y = \frac{1}{3}x$  by a dilation obtained using the floor function and with structuring set equal to the rectangle  $[-\frac{1}{2}, \frac{1}{2}] \times [-\frac{5}{6}, \frac{5}{6}]$  (courtesy Adama Arouna Koné).

*Partner:* Adama Arouna Koné.

*Financed by:* Christer Oscar Kiselman: Kingdom of Sweden.

Adama Arouna Koné:

- (1) International Science Programme (ISP) 2011–2016;
- (2) Université des Sciences, des Techniques et des Technologies de Bamako (USTTB), Bamako I, 2011 — 2018 January 07;
- (3) École Normale d'Enseignement Technique et Professionnel (ENETP), 2018 January 08 — .



*Figure 10.4.* (Project 10.5.) Covering a Euclidean plane by a dilation, using the floor function and with structuring set equal to the box  $[-\frac{1}{2}, \frac{1}{2}] \times [-\frac{1}{2}, \frac{1}{2}] \times [-\frac{9}{8}, \frac{9}{8}]$  (courtesy Adama Arouna Koné).

*Publications:*

Koné, Adama Arouna. 2016. *Géométrie digitale utilisée pour la discrétisation et le recouvrement optimal des objets euclidiens*. PhD Thesis, 114 pages. Bamako: Université des Sciences, des Techniques et des Technologies de Bamako I (USTTB).

Koné, Adama Arouna. 2017. Covering a Euclidean line or hyperplane by dilations of its discretization. *Vietnam J. Math.* **45**, no. 3, 351–368.

Part of this project will be covered by the book manuscript mentioned in Subsection 10.2.



*Figure 10.5.* (Project 10.5.) Adama Arouna Koné.

## 10.6. Discrete convolution equations

*Project manager:* Christer Oscar Kiselman.

*Project description:* We study solvability of convolution equations for functions with discrete support in  $\mathbf{R}^n$ , a special case being functions with support in the integer points. The more general case is of interest for several grids in Euclidean space, like the body-centered and face-centered tessellations of three-space, as well as for the non-periodic grids that appear in the study of quasicrystals. The theorem of existence of fundamental solutions by de Boor, Höllig & Riemenschneider is generalized to general discrete supports, using only elementary methods. We also study the asymptotic growth of sequences and arrays using the Fenchel transformation. Estimates using the Fourier transformation are studied.

Now duality of convolution operators is being investigated.

A study of quasicrystals is part of this project.

*Advisors:* Jan Boman, Ragnar Sigurdsson.

*Period:* 2012-01-11 — .

*Financed by:* Kingdom of Sweden.

*Publications:* A paper was published on 2015 May 07 in *Mathematika* (15-2). A second paper appeared in 2017 (17-2); see the report for 2017. Part of this project will be covered in the book manuscript mentioned in Subsection 10.2.

## 10.7. Zamenhof's Yiddish grammar

*Project manager:* Christer Oscar Kiselman.

*Project description:* Zamenhof wrote a Yiddish grammar (in Russian) around 1880. It was published in full only in 1982. A study of this grammar is being undertaken. In particular, a comparison with his language project *Universal Language* from about the same time is of interest.



*Figure 10.6.* (Project 10.7.) Л. Заменгофъ, L. Zamenhof (1859–1917) around 1879.



*Presentations:*

- 2016 July 29 at a conference in Nitra: “La jidogramatiko de Zamenhof kaj lia Lingvo universala.”
- 2017 November 19 at the *Limmud* conference in Stockholm: “Zamenhofs jiddisch-grammatika och hans språk Lingvo universala.”
- 2017 December 13 at the conference *The Heritage and Legacy of Ludwik Lejzer Zamenhof Between Judaism and Esperanto* at *Muzeum Historii Żydów Polskich POLIN* (The Museum of the History of the Polish Jews, Polin), in Warsaw, 2017 December 13–15. Title: “Zamenhof’s Yiddish grammar and his Universal Language.”
- 2018 February 28 at Uppsala University, Forum for Jewish Studies: “Zamenhof’s Yiddish grammar and his five constructed languages.” Invited by Lars M. Andersson.

*Publications:* An article in Esperanto was published in November 2016 (16-b). Two publications are being prepared, each of about 80 pages, one in English and one in Esperanto.

*Period:* 2015-08-01 — .

*Financed by:* Kingdom of Sweden.

## 10.8. Mathematical concepts and their linguistic expression in a multicultural setting



*Figure 10.7.* Hania Uscka-Wehlou.

*Project manager:* Hania Uscka-Wehlou (Figure 10.7).

*Partners:* Christer Oscar Kiselman, Adama Arouna Koné (Figure 10.5), Fanja Rakontondrajao (Figure 9.1), Xiaoqin Wang (Figure 10.8).

*Advisors:* Lars Mouwitz, Amites Rasho, Shiva Samieinia (Figure 10.2).

*Project description:* To study the relation between mathematical concepts and their expression in several languages. Special attention is devoted to the use of non-native languages.



Figure 10.8. (Project 10.8.) Xiaoqin Wang.

*Project description in more detail:* The languages of interest here are Swedish as the main language in Sweden, and all other languages that are used in schools in Sweden. Since the project manager's native language is Polish and since she has perfect command also of Dutch and Swedish, it is natural that these languages come into focus. There are many students and teachers in Swedish schools with Polish as their first language. Persian, Arabic, and Kurdish are also present in Swedish schools, and the group possesses, in its advisors, competence also in those languages.

However, other languages that are not common here can be of interest, among them Bamanankan and Malagasy. In Madagascar, the language in higher education is French, but the students' first language is usually Malagasy, a language of the Malayo-Polynesian branch of the Austronesian language family, with some 18 million native speakers. Fanja is very active in the creation of mathematical terms in Malagasy. As a small example, she has created the word *tampaha* for fractal, the concept introduced and popularized by Benoît B. Mandelbrot (1924–2010), and this term has been widely accepted in Madagascar. I received a research grant from the Royal Academy of Arts and Sciences for a visit by Fanja to Uppsala, which took place in February 2018 (see Subsection 9.1).

The creation of scientific terms, which has a rich history and is still going on in many languages, proceeds along two distinct avenues. One is the method of etymological translation, where a term (in Classical Greek, Latin, or other languages with a strongly developed terminology) is analyzed in its components and the components are translated. Typical examples are the Dutch *sterrenkunde* and the Icelandic *stjörnufræði*, which both mean 'astronomy' (*fræði* means 'science'). When this does not work, the other method comes into focus: the phonetical translation, yielding terms like *algebra* and *geometri* in Swedish, *algebra* and *jeometria* in Malagasy—in contrast to the Dutch and Icelandic *meetkunde* and *flatarmálafræði*, which both mean 'geometry' (*to meten* means 'to measure'; *flatarmál* means 'surface'), and are created according to the first-mentioned method of etymological translation.

The current work with Malagasy terminology illustrates basic principles in mathematical language policy and is therefore a valuable help in illustrating quite general problems, problems present in Swedish and many other languages.

*Period:* 2016-04-01 — .

*Financed by:*

Hania Uscka-Wehlou:

- (1) Man In The Middle AB (MITM);
- (2) Uppsala University 2017 August 15 — 2019 August 13.

Christer Oscar Kiselman: Kingdom of Sweden.

Adama Arouna Koné:

- (1) Université des Sciences, des Techniques et des Technologies de Bamako (USTTB), Bamako I, 2016 — 2018 January 07;
- (2) École Normale d'Enseignement Technique et Professionnel (ENETP), 2018 January 08 — .

Fanja Rakotondrajao:

- (1) Université d'Antananarivo;
- (2) the Royal Academy of Arts and Sciences (a grant to the amount of 25,498 SEK).

Xiaoqin Wang: University of Gävle.

*Presentations:* Hania Uscka-Wehlou has given five presentations related to this project, of which two were given in 2018.

- 2016-04-11. Presentation *Översättarverkstan: autismsens språk — matematikens språk (on translating mathematical terminology)* at the seminar on Polish language at Stockholm University, Department of Slavic Languages, for students and researchers from the department. Invited by Professor Maria Zadencka. <https://vimeo.com/162868038/b47d9f35ff> (in Swedish).
- 2017-05-12. Presentation *Mathematics and languages* during a conference for teachers of the Polish language in Sweden organized by Stockholm University and the Swedish Institute: <https://vimeo.com/217304561> (in Swedish).
- 2017-10-06. Presentation and workshop *Interactions between mathematics and languages in learning and teaching* for native-language teachers in Södertälje (three hours: a lecture plus workshop for about 90 teachers teaching about 40 different languages). Invited by Mary-Anne Eliasson, Municipality of Södertälje. (The municipality offers education in 53 languages, taught by 112 teachers.)
- 2018-01-26. Presentation *Languages for mathematics: sometimes helpful, sometimes not; with examples from several European languages*, during the conference for mathematics teachers *Matematikbiennalen 2018* in Karlstad.
- 2018-02-06. A guest lecture in the course *Mathematics Teaching Practice* for teacher candidates, invited by Veronica Crispin-Quinonez and Erik Östergren.

*Publications:* Two publications appeared in 2017: items 17-1 and 17-4 mentioned in the report for 2017. During 2018 one publication appeared:

Uscka-Wehlou, Hania. 2018. Svansklippning och andra förtjusande matematiska aktiviteter. *Nämna*, No. 1, 55–61.

## 11. Five completed research projects

For some research projects finished earlier, see the reports for 2015 through 2017.

### 11.1. Language choice in theses in mathematics at Uppsala University and in a Nordic journal

*Project description:* A study of language choice in doctoral thesis, showing the changes from Latin over Swedish to French, German and then to English.

*Period:* 1998–2016 March 28.

*Publication:* A paper was accepted in 2016 for publication in *Normat*, volume **61**, No. 2. Not yet published as of 2019 January 25.

### 11.2. Combination of word elements in Esperanto

*Project manager:* Christer Oscar Kiselman.

*Project description:* This is a study of word formation in Esperanto, with an historical survey and questions for the future.

*Period:* 2011-01-11 — 2016-12-31.

*Publication:* The project was essentially finished with the article “Kombineblo de vort-elementoj en esperanto — rigardoj malantaŭen kaj antaŭen” (15-a). However, some kind of continuation is being contemplated.

### 11.3. Werner Fenchel, a pioneer in convexity theory and a migrant scientist

*Project description:* Werner Fenchel (1905–1988) was a pioneer in convexity theory and in particular the use of duality there. When asked about his views on the many terms used to express this duality he described in a private letter (1977) the whole development from Legendre and onwards, as well as his preferences concerning the choice of terms. A survey of basic notions of convexity theory is sketched, as well as the background for Fenchel’s leaving Germany and moving to Denmark and later to Sweden.

*Period:* 2013–2016.

*Publication:* A paper was accepted in 2016 for publication in *Normat*, volume **61**, No. 2. Not yet published as of 2019 January 25.

### 11.4. How to best fold a triangle

*Project manager:* Christer Oscar Kiselman.

*Project description:* We fold a triangle once along a straight line and study how small the area of the folded figure can be. It can always be as small as the fraction  $2 - \sqrt{2}$  of the area of the original triangle. This is best possible: For every positive number  $\varepsilon$  there are triangles that cannot be folded better than  $2 - \sqrt{2} - \varepsilon$ .

*Period:* 2005 April — 2018 February 17.

*Advisor:* Bo Senje.

*Financed by:*

(1) Uppsala University 2005 — 2006 April 30;

(2) Kingdom of Sweden 2006 May 01 — 2018 February 17.

*Publication:* See 17-3, mentioned in the report for 2017, and item 18-1 mentioned in Subsection 1.1 above.

### **11.5. Approaching Esperanto**

*Project manager:* Christer Oscar Kiselman.

*Project description:* Publication of a book on how to approach Esperanto as a language and a cultural phenomenon. Fourteen chapters, 229 pages.

*Period:* 2015 — 2018 January 30.

*Co-editors:* Renato Corsetti; Probal Dasgupta.

*Authors:* Javier Alcalde, Detlev Blanke, Cyril Brosch, Probal Dasgupta, Sabine Fiedler, Federico Gobbo, Kimura Goro Christoph, Ilona Koutny, Haitao Liu, Carlo Minnaja, Hiroshi Nagata, Renato Corsetti, Orlando E. Raola, Giorgio Silfer, Humphrey Tonkin.

*Financed by:* Kingdom of Sweden and others.

*Publication:* The book appeared in January 2018. See item 18-i in Subsection 1.1 and Subsubsection 1.4.1 above.

## **12. Six referee reports (not reported to Squirrel)**

### **2018.R1. *Journal of Mathematical Imaging and Vision***

David Coeurjolly asks about a manuscript. Report sent 2018 February 11.

### **2018.R2. *Palestine Journal of Mathematics***

Simon Donaldson asks about a manuscript. Report sent 2018 February 11.

### **2018.R3. *Journal of Mathematical Imaging and Vision***

David Coeurjolly asks about a manuscript. Report sent 2018 May 13.

### **2018.R4. *Journal of Mathematical Imaging and Vision***

David Coeurjolly asks about a revised version of the manuscript mentioned above under 2018.1. Report sent on 2018 June 06.

### **2018.R5. *Journal of Mathematical Imaging and Vision***

David Coeurjolly asks about a revision of the manuscript mentioned under 2018.3 above. Report sent 2018 August 13.

### **2018.R6. *Discrete Geometry for Computer Imagery 2019***

Akihiro Sugimoto asks about a ms intended for publication in the proceedings volume of DGCi 2019. Report sent 2018-11-15.

### 13. Objects with the name of Kiselman

The largest known material object with the name of Kiselman is the asteroid with number 12673, officially named for my oldest son Dan Samuel Kiselman. Its estimated diameter is 7.837 km. A Euclidean ball of that diameter has a volume of some 252 billion cubic meters, but the gravity on Kiselman is much too small to force the material to form a ball. Whatever the shape may be, Kiselman 12673 is certainly much larger than the roundabout Kiselman in Uppsala, at the intersection of Dag Hammarskjölds väg and Regementsvägen, inofficially named so for my efforts during my time as dean to get a roundabout built there. However, there are also some non-material objects, to be described below.

#### 13.1. Kiselman's minimum principle

In my paper in *Inventiones Mathematicae* in 1978, item 78-1 in my web site, I proved a result on convexity of marginal functions of plurisubharmonic functions. It became known as “Kiselman's minimum principle” and has since been used in many situations and referred to by that name. The name appears in the following titles of published articles.

- Berndtsson, Bo. 1998. Prekopa's theorem and Kiselman's minimum principle for plurisubharmonic functions. *Math. Ann.* **312**, no. 4, 785–792.
- Darvas, Tamás; Rubinstein, Yanir A. 2016. Kiselman's principle, the Dirichlet problem for the Monge-Ampère equation, and rooftop obstacle problems. *J. Math. Soc. Japan* **68**, no. 2, 773–796.

#### 13.2. Kiselman's semigroup

In my paper in the *Transactions of the American Mathematical Society* in 2002, item 02-1 in my web site, I studied a semigroup of order eighteen with three generators, which later became known as “Kiselman's semigroup” or “Kiselman's monoid.” Generalizations to any number of generators are easily done, which explains the plural in the title of six of the following eight articles.

The name can appear in the text of a publication or even in its title without being mentioned in the bibliography (for an example, see Męcel & Okniński 2019 below). In those cases it will be missing in bibliometric analyses, which lists references but not names in titles, and I will not receive any points in the race.

- Aragona, Riccardo; D'Andrea, Alessandro. 2013. Hecke-Kiselman monoids of small cardinality. *Semigroup Forum* **86**, no. 1, 32–40.
- Ashikhmin, D. N.; Volkov, M. V.; Zhang, Wen Ting. 2015. The finite basis problem for Kiselman monoids. *Demonstr. Math.* **48**, no. 4, 475–492.
- Collina, Elena; D'Andrea, Alessandro. 2015. A graph-dynamical interpretation of Kiselman's semigroups. *J. Algebraic Combin.* **41**, no. 4, 1115–1132.
- Forsberg, L.: Effective representations of Hecke-Kiselman monoids of type A. *arXiv:1205.0676*.
- Ganyushkin, Olexandr; Mazorchuk, Volodymyr. 2011. On Kiselman quotients of 0-Hecke monoids. *Int. Electron. J. Algebra* **10**, 174–191.
- Grensing, Anna-Louise. 2016. Monoid algebras of projection functors. *Journal of Algebra*, **369**, 16–41. [This paper does not quote any paper by me, but has *Hecke-Kiselman semigroup* as a

keyword and refers to Ganyushkin & Mazorchuk (2011) and Kudryavtseva & Mazorchuk (2009) that mention me in their titles.]

Kudryavtseva, Ganna; Mazorchuk, Volodymyr. 2009. On Kiselman's semigroup. *Yokohama Math. J.* **55**, no. 1, 21–46.

Męcel, Arkadiusz; Okniński, Jan. 2019. Growth alternative for Hecke–Kiselman monoids. *Publications Mathematiques* **63**, no. 1, 219–240. [Does not mention any paper by me in the list of references, although the name Kiselman appears in the title.]

So the name appears in seven titles, but in *MathSciNet* only two citations from references and two from reviews of my original publication from 2002 are listed.

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Since September 2014, the author is a guest professor at Uppsala University, more precisely at the Department of Information Technology, Division of Visual Information and Interaction, Computerized Image Analysis and Human-Computer Interaction.

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