Activity Report for the Years 2020 and 2021

... so far

Christer Oscar Kiselman

Since the academic year 1993/94, the Centre for Image Analysis of Uppsala University (in Swedish Centrum för bildanalys, CBA) has published annual reports. From 1997 through 2019 they cover calendar years, which are also fiscal years. On 2021 March 05, the Board of the CBA decided not to prepare any report for 2020; instead it was decided to publish a report in 2022 joint for the two years 2020 and 2021. The Director of the center, Professor Ingela Nyström, informed about this decision on 2021 March 08.

I am now preparing the present activity report, to be successively completed as 2021 progresses.

Contents

1. Fourteen publications ................................ 1
2. Works accepted for publication ...................... 4
3. Three submitted manuscripts ........................ 5
4. Editorial work ....................................... 5
5. Five talks ........................................... 5
6. Participation in eight conferences .................... 6
7. Seminar at the Centre for Image Analysis ............ 6
8. Organization of meetings ................................ 7
9. Ten referee reports .................................. 7
10. A paper submitted and rejected ..................... 8
11. A visitor: Rahul Gaurav ............................. 8
12. Visits ............................................... 9
13. Memberships in academies ........................... 10
14. Honors .............................................. 10
15. Memberships in learned societies .................... 11
16. Six current research projects .......................... 11
17. Two completed research projects ..................... 17
18. Bonemine, Goudariz and Puh
    at the Department of Information Technology . . 18
19. Consequences of Covid-19 ........................... 19
20. A fire ............................................... 19

1. Fourteen publications

During 2020 and 2021 up till today, I have published one scientific article jointly with my former PhD student Erik Melin, one Letter to the Editor cosigned by several
mathematicians, and, as a sole author, six articles plus a translation into Polish of one of these, two essays, and three short notes, bringing the total to fourteen.

1.1. Lingvoj kaj scienco (20-1)


1.2. Języki i nauka (20-2)


1.3. André Martineau: Some memories (20-i)


Published in Complex Analysis and Operator theory 14, No. 7, Article-id 74. Submitted on 2020 June 27. Accepted on 2020 July 29. Published online on 2020 September 14.

1.4. Existence of continuous right inverses to linear mappings in finite-dimensional geometry (20-3)

An article joint with Erik Melin, 14 pp.

Published in Mathematische Semesterberichte. Submitted on 2020 May 27. Accepted for publication on 2020 July 29. Published online on 2020 October 19.

1.5. Cauchy problems for discrete holomorphic functions (20-4)

A chapter in a book devoted to the memory of Carlos Alberto Berenstein (1944–2019), edited by Daniele Struppa & Irene Sabadini (15 pp.).

Published in Complex Analysis and Operator Theory 15, No. 3. Submitted on 2020 April 15. Accepted for publication on 2020 August 12. Published online on 2020 November 02.
1.6. Akademio de Esperanto fronte al novaj taskoj (20-ii)

An article 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.

Published in Esperantologio / Esperanto Studies. Nova Serio / New Series 1 (9), pp. 41–54, edited by Humphrey Tonkin and Orlando Raola. Accepted for publication on 2015 December 17. Published on 2020 November 02. ISBN 9781595694096, ISSN 1311-3496.

1.7. Editor’s word of welcome (21-i)


1.8. Elementoj de digita geometrio, matematika morfologio kaj diskreta optimumado (21-1)


1.9. Kiel plej bone faldi triangulon (21-2)


1.10. Editor’s introduction (21-ii)


1.11. La jidogramatiko de Zamenhof kaj lia Lingvo universala (21-a)


1.12. La rektoj de E˘uklido (21-3)


1.13. Letter to the Editor (21-iii)

1.14. **Existence of continuous right inverses to linear mappings in finite-dimensional geometry (21-4)**

An article joint with Erik Melin, 14 pp.


Carlehed, Magnus, representing twelve former PhD students; Kiselman, Christer Oscar. Urban Cegrell (1943–2021) [Obituary of my doctor #2]. Published in four newspapers: *Västerbottens-Kuriren* 2021 August 17; *Svenska Dagbladet* 2021 August 24; *Dagens Nyheter* and *Sundsvalls Tidning* 2021 August 25.

2. **Work accepted for publication**

2.1. **Zamenhof’s Yiddish grammar and his Universal Language**

Manuscript submitted on 2019 December 13 (110 pp.). Accepted for publication as the first volume in the new *Acta* series *Uppsala Jewish Studies* of Uppsala University on 2021 January 28. Final version sent 2021 April 25.

The publication was made possible by a grant of 26 000 SEK from The Royal Society of Arts and Sciences of Uppsala (*Kungl. Vetenskapssamhället i Uppsala*) for which I am deeply grateful—the decision was taken by the Board of the society on 2021 March 02 following a recommendation by Professor Ingela Nyström.

2.2. **Complex convexity**

A chapter (140 pp.) intended for the *Handbook of Complex Analysis*, edited by Steven G. Krantz and to be published by Taylor & Francis.

Submitted on 2021 January 08. Two referee reports received on 2021 January 16. Accepted for publication on 2021 March 06.

2.3. **Elements of Digital Geometry, Mathematical Morphology, and Discrete Optimization**


2.4. **Duality of convolution operators: A tool for shape analysis**

3. Three submitted manuscript

3.1. Generalized elementary functions

A text (14 pp.) on classes of functions that are elementary in a wider sense than the
functions which are elementary in the sense of Liouville.

Submitted on 2021 March 05. Two referee reports received in May 2021. A revised
version submitted 2021 May 14. Final version sent on 2021 May 17. As of May 2021,
the two referees and the responsible editor are all for publication.

3.2. A study of two explanations in the general theory of relativity

A manuscript (10 pp.) on explanations offered for the deflection of light rays passing
close to the sun and for the Shapiro time delay. Submitted on 2021 October 07.

3.3. Which convexity properties are preserved under linear mappings?

A manuscript (13 pp.) on convexity properties of marginal functions defined on arbi-
trary subsets of $\mathbb{R}^n$. Submitted on 2021 November 12.

4. Editorial work

4.1. Matematiko translimen, No. 8

The eighth issue of the journal of Internacia Asocio de Esperantaj Matematikistoj, with
five articles by four authors and comprising 180 pp. The authors are Jón Hafsteinn
Jónsson, Shigeaki Nagamachi, François Lo Jacomo and me (author of two articles,
21-1 and 21-2, plus a short note, 21-i).


The second volume of the Aktoj of the Internacia Scienca Akademio Comenius, named
for Johan Amos Comenius (1592–1670), with eight chapters by five authors and com-
prising 210 pp. The authors are Renato Corsetti (author of two chapters), Fabrizio
Angelo Pennacchietti (two), Leif Nordenstorm (one), Humphrey Tonkin (one) and me
(two chapters, 21-a and 21-3, plus a short note, 21-ii).


5. Five talks

5.1. Ufa

On 2021 April 16 I was invited to give a talk at the Общественно-институтский се-
минар (Obshcheinstutituchskij seminar) in Ufa via Zoom, invited by Юрий Корджуков (Yuri
Kordjukov) at the Институт математики с вычислительным центром УФИЦ
РАН (Institut matematikij s vyčislitel'nym centrom UFIC RAN). Title: Duality of
convolution operators. Time: 14:00–15:00 Ufa time (11:00–12:00 in Sweden).

There were 20 participants, not only in Ufa but also in Moscow, Saint Petersburg,
Nizhny Novgorod and Uzbekistan.
5.2. Toulouse

I was invited to give a talk at an international conference in Toulouse, 2021 May 31 through June 04, called AMAZER: Analysis of Monge–Ampère, A Tribute to Ahmed Zeriahi. My talk, given on May 31, 17:00–17:30, at the location, had the title “Ahmed Zeriahi, a great mathematician and a faithful friend.” The conference was originally planned to take place in June of 2020, then in September of 2020, and could now finally be realized.

5.3. Stockholm

On 2021 September 15, I gave a talk at the Analysis Day in Memory of Mikael Passare at Stockholm University, being physically present. It had the title A study of two explanations in the general theory of relativity.

5.4. Fribourg, first talk

Professor Enrico Le Donne at Université de Fribourg invited me to give a mathematical lecture on 2021 October 14. It had the title Discrete phenomena, which are of growing interest in science, can be difficult but need to be understood.

5.5. Fribourg, second talk

Professor Katharina M. Fromm, Vice-Rector and Dean at Université de Fribourg, invited me to give a lecture on 2021 October 15 at the Faculté des Sciences et de Médecine. It had the title Living with mathematics and languages.

This was the eleventh talk in a series of lectures called Fribourg Chaim Weizmann Lectureships, named for Chaim Weizmann (1874–1952), Israel’s first president, who earned a PhD degree in chemistry in 1899 at this university. One of my predecessors in this series is Dan Shechtman, Technion, Haifa.

6. Participation in eight conferences

During 2020 and up to September 2021, I have talked in two conferences and participated in six conferences without giving a talk:

6.1. 2020 August 01–08: The 105th World Congress of Esperanto; took place as a Zoom meeting.
6.2. 2020 November 10–15: The conference Limmud took place as a Zoom meeting.
6.6. 2021 July 17–24: The 106th World Congress of Esperanto; took place as a Zoom meeting.

6.8. 2021 September 15: *Analysis Day in Memory of Mikael Passare* at Stockholm University. Three lectures were given via Zoom and one, mine, was presented on location; see Subsection 5.3 above.

7. **Seminar at the Centre for Image Analysis**

On 2021 June 14, at 14:15–15:00, I gave a talk via Zoom at the Centre for Image Analysis (CBA), entitled “Writing and publishing: Some experience acquired.” I reported on my experience from writing articles and books during the last twenty years.

8. **Organization of meetings**

I was “Honorary Chair” at the *IAPR International Conference on Discrete Geometry and Mathematical Morphology* (DGMM 2021), taking place during four days: 2021 May 24–27.

The one-day conference *Analysis Day in Memory of Mikael Passare* on 2021 September 15 was organized by Mats Andersson, Christer Oscar Kiselman, and Pavel Kurasov.

9. **Ten referee reports**


Alex Bronstein asks about a revision of the manuscript mentioned in the report for 2019 under Subsection 2019.R8. Received 2020 January 11. Referee report sent 2020 February 02.

2020.R2. *Image analysis and Stereology*

Marko Kreft asks about a submitted manuscript. Received 2020 January 19. Referee report sent 2020 February 06.


Michael Breuβ asks about a submitted chapter to the proceedings volume after the Dagstuhl Conference in October 2018. Manuscript received 2020 May 04. Referee report sent 2020 May 14.


Alex Bronstein asks about a new revision of the manuscript mentioned under 2020.R1 above. Manuscript received 2020 May 05. Report sent 2020 May 11.


Yuri A. Kordyukov asks about a submitted article. Manuscript received on 2020 November 08. Referee report sent on 2020 November 18.
2021.R1. *DGMM 2021*

Joakim Lindblad asks about an article submitted to the proceedings volume of the conference *Discrete Geometry and Mathematical Morphology* (DGMM 2021), to be held in Uppsala 2021 May 24–27.

Manuscript received on 2020 December 29. Referee report sent on 2021 January 10.


Filip Malmberg asks about a manuscript submitted to the *Journal of Mathematical Imaging and Vision*. Manuscript received on 2021 July 12. Referee report sent on 2021 July 17.


10. **A paper submitted and rejected**

10.1. *André Martineau: Quelques souvenirs*

An essay on the life and work of André Martineau (1930–1972) (7 pp.).

Submitted to *la Gazette des Mathématiciens* on 2020 June 23. Rejected on 2020 June 26 by the Editor-in-Chief, Damien Gayet.

11. **A visitor: Rahul Gaurav**

Raul Gaurav at Institut du Cerveau, Paris Brain Institute (ICM), Pitié-Salpêtrière Hospital, visited Uppsala University during a week, 2020 November 29 through December 06. I was his main host.

The Centre for Image Analysis invited him for a seminar on November 30, chaired by Robin Strand.

The Centre for Interdisciplinary Mathematics, invited Rahul for a lecture on December 01 in the seminar series *Complex Systems* (CoSy), chaired by Benjamin Meco.

At both these occasions, physical participants were few; those on Zoom, many.
12. Visits

12.1. Pascal Adjamagbo

I met Pascal Kossivi Adjamagbo for scientific discussions in Paris on 2021 May 29 and June 07. He is Professor at Université Paris Sorbonne (formerly Université Pierre et Marie Curie, Paris 6). He is interested on the Jacobian conjecture (a famous open problem) and in the history of the development of African science.

12.2. Rahul Gaurav

I met Rahul Gaurav for scientific discussions in Paris on 2021 June 06 and 08. He is currently preparing a PhD Thesis. See also Section 11.

12.3. Jean Serra

I met Jean Serra (one of the two creators of mathematical morphology) for scientific discussions in Paris on 2021 May 29 and June 06.

12.4. Henri Skoda

I met Henri Skoda for scientific discussions in Paris on 2021 June 05. He is Professor Emeritus at Université Paris Sorbonne (formerly Université Pierre et Marie Curie, Paris 6).

12.5. Hughes Talbot

I met Hughes Talbot for scientific discussions in Paris on 2021 June 08. He is Professor of Artificial Intelligence and Computer Vision at CentraleSupélec in Paris, and has worked in Australia during ten years.

12.6. Michel Waldschmidt

I met Michel Waldschmidt for scientific discussions in Paris on 2021 June 07. He is Professor Emeritus at Université Paris Sorbonne (formerly Université Pierre et Marie Curie, Paris 6). Now working on Lidstone polynomials, among many other things. Cooperating with the International Science Programme, Uppsala.

He has been President of the Société Mathématique de France from June 2001 to June 2004, and Vice-President of CIMPA (Centre International de Mathématiques Pures et Appliquées) from January 2005 to January 2009, and is still cooperating with this center.

12.7. Rahul Gaurav’s thesis defence

On 2021 October 12, at 14:30, Rahul Gaurav defended his Doctoral Thesis entitled *Nigral Neuromelanin and Iron Content Characterizing Parkinson’s Disease and REM Sleep Behavior Disorder. A Multimodel MRI Study Using Deep Learning* at Sorbonne Université, École doctorale 158, Cerveau, Cognition et Comportement (3C). The defense took place at ICM, Institut du Cerveau, the Paris Brain Institute, Pitié-Salpêtrière Hospital. I was there.
12.8. Visit to Centre de recherche et de documentation du Jura bernois

Jerry Krattiger and I visited on 2021 October 19 the research center Memoires d’ici; Centre de recherche et de documentation du Jura bernois in Saint-Imier, State of Jura. This center is unique in the world in its status and functioning. Jura is the most recent canton, or state, to have joined the Confœderatio Helvetica.

We received a comprehensive presentation of the center by Sylviane Messerli, Directrice of the center. She had prepared many documents of special interest for us. Sylviane defended her doctoral thesis, entitled Edipe enténébré. Légendes d’Edipe au XIIe siècle, at Université de Genève in 2001.

13. Memberships in academies

Royal Academy of Arts and Sciences, Uppsala 1983—present
Royal Society of Sciences, Uppsala 1984—present
International Academy of Sciences (AIS) 1984—present
Internacia Scienca Akademio Comenius 1986—present
[Esperanto Academy 1989—2015-12-15]
Royal Swedish Academy of Sciences 1990—present
Polska Akademia Umiejętności (Polish Academy of Arts and Sciences) 2002—present
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

14. Honors

Docteur Honoris Causa, Université Paul Sabatier, Toulouse.
Approved by the Minister of National Education on 2000 July 06
Title awarded in Toulouse on 2002 May 17
Gold medal for Zealous and Devoted Public Service, Kingdom of Sweden 2001 June 08
Officier de l’Ordre National du Mérite, appointed by the President of the French Republic, Jacques Chirac. Decree dated 2002 April 05
The insignia of the order handed over by the Ambassador of France to Sweden, Patrick Imhaus, on 2002 October 23
Gustavus Adolphus Gold Medal, awarded by Uppsala University on 2006 May 15
Honorary member, AIS-Bulgaria, elected on 2013 June 25
Diploma of the Universal Esperanto Asociation for outstanding activity for the International Language Esperanto; for works and publications in science and interlinguistics. Received in Buenos Aires on 2014 August 02
Pirlot Prize of the International Academy of Sciences in the category Courses (one of two prizes for the years 2013–2018). Decision announced in Lisbon on 2018 August 03
Docteur Honoris Causa. Jesper Andersson, Dean at Linnaeus University, calls me on 2021 September 30 to inform me that I will receive an honorary doctorate on 2022 January 28
15. Memberships in learned societies

Swedish Astronomical Society (Life member) 1954—present
Swedish Mathematical Society (Life member) 1960s—present
American Mathematical Society (Life member) 1966—present
Société Mathématique de France 1960s—present
European Mathematical Society 1990s—present
Uppsala Humanistiska Förbund (The Uppsala Union for the Humanities) 1990s—present
Scandinavian Society for Iranian Studies (Associate member) 2010—present

16. Six current research projects

16.1. Complex convexity

![Figure 1.](project16_1.png)

*Figure 1. (Project [16](#)) The base in the complex plane of a locally lineally convex set in $\mathbb{C}^2$ which is not lineally convex.*

From publication 16-1; courtesy Hania Uscka-Wehlou.

*Project manager:* Christer Oscar Kiselman.

*Project description:* Two complex variables correspond to four real variables, so in complex geometry, we need to see in four dimensions or more. Can you see in four dimensions without building a *Theatrum Visuale* showing all four dimensions? Yes, it is indeed possible to train one’s inner eyes to see in four dimensions. A nontrivial but most rewarding sport. We can actually arrive at true stereoscopic vision . . .

A bounded open set with boundary of class $C^1$ which is locally weakly lineally convex is weakly lineally convex, but, as shown by Yuriǐ Zelinskiǐ, 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 $\mathbb{R}^n$ or $\mathbb{C}^n$. Preliminary results on this kind of regularity were presented at a conference at Stockholm University on 2015 September 16; cf. Subsection 1.7 in the report for 2019.

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;

Publications: There are several publications in this project; the latest (19-1) appeared online in July 2019; the print version was published in October 2019.

A chapter intended for a book entitled *Handbook of Complex Variables* and edited by Steve Krantz, was submitted on 2021 January 08 and accepted on 2021 March 06.

Period: 1967-10-01 — present.

16.2. Elements of Digital Geometry, Mathematical Morphology, and Discrete Optimization

Project manager: Christer Oscar Kiselman.
Partners: Erik Melin, Hania Uscka-Wehlou, Shiva Samieinia, Adama Arouna Koné.
Advisors: Jean Serra, Jesús Angulo.
Period: 2002 — .

Financed by: Christer Oscar Kiselman:
1. Uppsala University 2002 — 2006-04-30;

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 — present.

Publications: Lecture notes from 2002 (78 pages) and 2004 (95 pages) are available at 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 (18-2). Published in 2018 at the web site of the International Academy of Sciences (AIS).
These lecture notes, somewhat revised, were published in January 2021 (21-1); see Subsection 1.3.

A book manuscript, comprising xii + 458 pages, has now been accepted to be published by World Scientific, Singapore; see Subsection 2.3 above.

16.3. Convexity of marginal functions in the discrete case

Figure 2. (Project 16.3.) 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 — present.
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. Most of the results are covered by the book manuscript mentioned in Subsection 2.3 above. However, some generalizations remain to be studied. The paper on duality, mentioned in Subsection 2.4 above, is also relevant here.

16.4. 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.

Figure 3. (Project 16.4.) Adama Arouna Koné.

Figure 4. (Project 16.4.) 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.

Period: 2010-01-11 — present.
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 — present.

Publications:

16.5. Discrete convolution equations

Project manager: Christer Oscar Kiselman.

Project description: We study solvability of convolution equations for functions with discrete support in $\mathbb{R}^n$, 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 tesselations 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.

Advisors: Jan Boman, Ragnar Sigurdsson.

Period: 2012-01-11 — present.

Financed by: Kingdom of Sweden.


A study of quasicrystals is part of this project. So is the paper on duality mentioned in Subsection 2.4. A majority of the results in this project are covered in the book manuscript mentioned in Subsection 2.3.
16.6. Zamenhof’s Yiddish grammar

Figure 6. (Project 16.6.) Й. Заменгофъ, L. Zamenhof (1859–1917) around 1879.

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 has been undertaken. In particular, a comparison with his language project Universal Language from about the same time is of interest. (Lingvo universala was a predecessor of Esperanto, published in 1887.)

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.”
• 2018 February 28 at Uppsala University, Forum for Jewish Studies: “Zamenhof’s Yiddish grammar and his five constructed languages.” Invited by Lars M. Andersson.
• 2019 May 29 at Zespół Szkół Ogólnokształcących w Złotoryi, a public school in Złotoryja, “La kvin artefaritaj lingvoj de Zamenhof” (Zamenhof’s five constructed languages). Invited by Małgorzata Komarnicka and Aleksander Pecyna.
• 2019 May 31. I was invited by the organizers of the Annual National Congress of Esperanto, held in Stockholm May 31 through June 02, to give a talk on May 31. My title was “La jidogramatiko de Zamenhof kaj lia Lingvo universala” (Zamenhof’s Yiddish grammar and his Universal Language).

Publications: An article was published in November 2016 (16-b), and a short paper appeared in 2019 (19-b).

An article in Esperanto (107 pp.) was published on 2021 January 20; see Subsection 1.11.

An article in English (105 pp.) was submitted for possible publication on 2019 December 13 and accepted for publication on 2021 January 28; see Subsection 2.1.
Period: 2015-08-01 — present. The project will be finished when this book is published.

It is a continuation of a similar project on the influence of Yiddish on Esperanto. The latter was started in 1982 and gave rise to a publication in 1992, see item 92-a in my web site.

Financed by: Kingdom of Sweden; for the publication costs of the English version also by a grant from the Royal Academy of Arts and Sciences of Uppsala.

17. Two completed research projects

For some research projects finished earlier, see the reports for 2015 through 2019.

17.1. Mathematical concepts and their linguistic expressions in a multicultural setting

![Figure 7. Hania Uscka-Wehlou.](image)

Project manager: Hania Uscka-Wehlou (Figure 7).

Partners: Christer Oscar Kiselman, Adama Arouna Koné (Figure 5).

Advisors: Lars Mouwitz, Fanja Rakontondrajao, Amites Rasho, Shiva Samieinia (Figure 2), Xiaoqin Wang.

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.


Financed by:

Hania Uscka-Wehlou:
1. Man In The Middle AB (MITM);
2. Uppsala University 2017-08-15 — 2019-08-13;

Christer Oscar Kiselman: Kingdom of Sweden.

Adama Arouna Koné:
1. Université des Sciences, des Techniques et des Technologies de Bamako (USTTB), Bamako I, 2016 — 2018-01-07;
2. École Normale d’Enseignement Technique et Professionnel (ENETP), 2018-01-08 — 2020-02-29.
Publications: Three publications: Hania has published two articles joint with me in 2017 and one as a sole author in 2018. See the reports for 2018, Section 10.8, and 2019, Section 12.8.

Presentations: Hania has made five presentations in connection with this project during the years 2016–2018; see the report for 2018, Section 12.8.

17.2. 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 — 2021-03-10.

Partner: Erik Melin.

Advisor: Hiroshi Yamaguchi.

Financed by: Christer Oscar Kiselman:


Publication: The project was finished with the publication (21-4) mentioned in Subsection 1.14 above.

18. Bonemin, Goudurix and Puh at the Department of Information Technology

During the calendar year of 2020, I was without access to my documents in the computer system at the Department of Information Technology during twenty-two days.

Three of these days occurred June 24–26; the problem being attributed to the computer Bonemin.

Eighteen of the days without access were during October 05–22. In spite of this, emails could be reached from home. The problem was now attributed to the server Goudurix, which, according to an internal message of October 14, cannot be repaired, since it is a unique server without spare parts and with no spare parts available on the market.

The importance of a disturbance is indicated along a scale called Severity. The problem in October was first classified as P2 Normal. It was then raised to P3 Major on October 12; then to P4 Critical on October 14, and finally to the highest level, P5 Blocker. However, these three changes were made not by the IT-specialists but by researchers at the department.

On October 23 I got access to my documents.

Again, on December 06 I did not have access to the computer system. This time, the problem was due the computer Puh, to which Bonemin was connected. The following day, Bonemin was made independent of Puh.

Nobody has explained to me why it took so long to bring the computer system to order in October 2020.
19. Consequences of Covid-19

Due to the pandemic I had to refrain from, or postpone, several trips, among them to Paris, Toulouse, Montréal and Bern.

Participation in congresses and conferences have also been affected, notably the following.

- **Analysis Day in Memory of Mikael Passare.** A conference to the memory of Mikael Passare (1959–2011) is held at Stockholm University each year in September, exceptionally in October. It is organized by Mats Andersson, Christer Kiselman and Pavel Kurasov (main organizer). The 2020 conference had to be cancelled—but in 2021 we were back.

- A conference in honor of Ahmed Zeriahi was first planned to be held at Université Paul Sabatier in Toulouse in June 2020, then postponed to September 2020, and could finally take place during five days, 2021 May 31 — June 04.

- The **IAPR International Conference on Discrete Geometry and Mathematical Morphology** (DGMM 2021), originally planned to be held at Uppsala University in December 2020, was postponed to 2021 May 24–27.

20. A fire

On 2020 October 29, a refrigerator a few meters from the office I use caught fire, destroying everything in that room but nothing in the six adjacent rooms. However, things in the adjacent rooms suffered from bad smell caused by the smoke, and were to be treated with ozone ($O_3$) in order to be freed from the smell.

Two chairs, a lamp, and other objects in the office I use disappeared during the ensuing reparation.

It was announced that the renovation of the seven rooms affected by the fire would take three weeks.

I was offered another office during the time of the renovation and could therefore work uninterruptedly.

After a final inspection on 2021 April 12, we were allowed to move back to the original premises, now perfectly clean and in good shape. I could start to work in my old office on April 28, almost six months after the fire.

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.

**Paper address:** P. O. Box 337, SE-751 05 Uppsala, Sweden

**Amber addresses:** kiselman@it.uu.se, christer@kiselman.eu

**URL:** www.cb.uu.se/~kiselman

The address may be changed later to www.it.uu.se/~kiselman

**ORCiD, Open Researcher and Contributor ID:** 0000-0002-0262-8913