

**UNIVERSITATEA DIN CRAIOVA**  
**FACULTATEA DE ȘTIINȚE**  
**DEPARTAMENTUL DE MATEMATICĂ**

Postul scos la concurs Asistent, Pozitia 17

Disciplinele postului: Analiză matematică 2 (pe RN); Cercetări operaționale; Analiză neliniară (DO,OB); Capitele speciale de ecuații cu derivate parțiale (DO); Teoria algebrică a numerelor (DO,OB); Geometrie analitică; Fundamentele geometriei (DO); Programarea calculatoarelor; Teoria probabilităților și statistică matematică; Software matematic.

Domeniul științific: Matematică

**FIȘA DE VERIFICARE**

a îndeplinirii standardelor universității pentru postul de **Asistent Universitar**  
publicat în Monitorul Oficial al României, Partea a III-a, nr. 569 din 28 Aprilie 2017

Candidat: **Maria Mălin**, Data nașterii: 07.05.1989

Funcția actuală: Asistent de cercetare

Instituția: Universitatea din Craiova

**1. Studiile universitare**

Nr. crt.	Instituția de învățământ superior	D o m e n i u l	Perioada	Titlul acordat
1.	Universitatea din Craiova	Matematică	2007-2011	Diplomă de licență
2.	Universitatea din Craiova	Matematică	2011-2013	Diplomă de master

**2. Studiile de doctorat**

Nr. crt.	Instituția organizatoare de doctorat	D o m e n i u l	Perioada	Titlul științific acordat
1.	Universitatea din Craiova	Matematică	2013-2016	Diplomă de doctor
2.	City University of Hong Kong	Matematică	2014-2017	Diplomă de doctor

**3. Studii și burse postdoctorale (stagii de cel puțin 6 luni)**

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**4. Grade didactice/profesionale**

Nr. crt.	I n s t i t u Ț i a	D o m e n i u l	Perioada	Titlul/postul didactic sau gradul/postul profesional
1.	City University of Hong Kong	Matematică	2015-2017	Asistent Universitar
2.	Universitatea din Craiova	Matematică	2015-2017	Asistent de cercetare

**5. Realizările profesional-științifice**

Relevanța și impactul rezultatelor științifice ale candidatului

Rezultatele științifice au fost publicate și trimise spre publicare în reviste ISI de mare prestigiu internațional și au fost citate în articole publicate în reviste importante. Deși activitatea mea de cercetare este foarte recentă, articolele mele au fost citate de 7 ori în reviste ISI cu factor de impact peste 0.5.

În cele ce urmează voi enumera doar câteva rezultate semnificative obținute în activitatea științifică recentă.

**1) P. G. Ciarlet, M. Malin, C. Mardare, *New estimates of the distance between two surfaces in terms of the distance between their fundamental forms*, submitted to *Annales de l'Institut Henri Poincaré (C) Analyse Non Lineaire*.**

În acest articol sunt stabilite noi inegalități neliniare de tip Korn pe o suprafață, în diverse spații Sobolev. Inegalitățile obținute sunt foarte importante deoarece pot constitui un prim pas în demonstrarea unei teoreme de existență în “nonlinear shell theory”. Am aratat în particular cum se poate elimina a treia formă fundamentală și cum astfel de inegalități neliniare se pot reduce la inegalitățile liniare clasice de tip Korn pe o suprafață, care au un rol important în modelul Koiter linear.

**2) P. G. Ciarlet, M. Malin, C. Mardare, *On a vector version of a fundamental lemma of J.L. Lions*, *Chinese Annals of Mathematics, Series B*, to appear.**

Obiectivul principal al acestei lucrări constă în a arăta o echivalență între o lemă fundamentală, datorată lui J.L. Lions, și alte rezultate precum: o versiune vectorială a inegalității lui J. Necas, o extindere a teoremei clasice a lui Donati la câmpuri matriciale cu o regularitate mai slabă, sau o versiune vectorială a unei proprietăți fundamentale de surjectivitate a operatorului de divergență, etc. Importanța acestei teoreme de echivalență constă în faptul că orice demonstrație independentă a uneia dintre aceste proprietăți reprezintă o nouă modalitate de a demonstra lema lui J.L. Lions.

**3) P. G. Ciarlet, M. Malin, C. Mardare, *New nonlinear estimates for surfaces in terms of their fundamental forms*, *C. R. Acad. Sci. Paris, Ser. I*, 355 (2017), pp. 226-231.**

În acest articol am dedus estimări ale distanței dintre două suprafețe în funcție de distanța dintre formele lor fundamentale, măsurate în raport cu diverse norme Sobolev. Am aratat în particular importanța acestor inegalități în modelul Koiter nelinier.

Acest articol a fost deja citat în revista: *Math. Models Methods Appl. Sci.*

**4) M. Malin, V. Rădulescu, *Infinitely many solutions for a nonlinear difference equation with oscillatory nonlinearity*, *Ricerche di Matematica*, Springer (2016), 65:193-208, DOI 10.1007/s11587-016-0260-5.**

In aceasta lucrare am studiat o problema discreta la limita ce contine un termen neliniar ce oscileaza la origine si o neliniaritate de tip putere. Daca termenul de tip putere este superliniar, folosind metode variationale, am stabilit existenta unui sir de solutii slabe pozitive ce converge la zero. In cazul subliniar, am demonstrat ca pentru orice numar natural  $n$ , problema are  $n$  solutii slabe daca parametrii problemei se afla intr-un anumit rang.

**5) M. Malin, C. Udrea, *Degenerate nonlinear elliptic equations with lack of compactness*, *Chinese Annals of Mathematics, Series B*, January 2016, Volume 37, Issue 1, pp 53-72.**

In aceasta lucrare am demonstrat existenta solutiilor pentru o problema eliptica degenerata cu o pondere pozitiva. De asemenea, am investigat si o problema de valori proprii pentru care am obtinut un rezultat de existenta ce contine informatii despre locatia si multiplicitatea functiilor proprii. Demonstratiile se bazeaza pe teoria punctului critic in spatii Sobolev cu pondere si pe inegalitati de tip Caffarelli-Kohn-Nirenberg. Am folosit o metoda specifica de tip minimax, fara a folosi conditia Palais-Smale.

**6) M. Malin, *Multiple solutions for a class of oscillatory discrete problems*, *Advances in Nonlinear Analysis*, Vol. 4, Issue 3, pp. 221-233, DOI:10.1515/anona-2015-0027, April 2015.**

In acest articol am studiat o problema discreta la limita ce contine un termen ce oscileaza la infinit si o neliniaritate de tip putere. Folosind metode variationale am stabilit rezultate de existenta a unui sir de solutii slabe pozitive ce converge la infinit, daca puterea este subliniara. In cazul superliniar, am stabilit conditii de existenta pentru cel putin  $n$  solutii,  $n$  fiind un numar natural.

Acest articol a fost premiat în competiția *Premierea Rezultatelor Cercetarii* (zona rosie) si a fost deja citat de 5 ori in revistele: *Electronic Journal of Differential Equations* (de 2 ori), *Advances in Nonlinear Analysis*, *Boundary Value Problems* (de 2 ori),

	<p><b>7) M. Malin, I. Rovența, <i>Some Remarks on Convex Network Flows for K-Spiders</i>, <i>Mathematical Problems in Engineering</i>, Vol. 2015, Article ID 710516, 6 pages, ISSN: 1024-123X.</b></p> <p>Am considerat functii convexe ce modeleaza fluxurile in retele arborescente. Notiunea de majorizare este folosita pentru a studia rezultate clasice din teoria convexitatii.</p> <p><b>8) M. Malin, <i>The Emden-Fowler problem for discrete operators with variable exponent</i>, <i>Electronic Journal of Differential Equations</i>, Vol. 2014 (2014), No. 55, pp. 1-13,</b></p> <p>Acest articol a fost citat in revista: <i>Boundary Value Problems</i>.</p> <p><b>9) M. Malin, <i>Discrete Emden-Fowler problems driven by nonhomogeneous differential operators</i>, <i>Annals of the University of Craiova, Mathematics and Computer Science Series</i>, Vol. 41(1), 2014, Pages 59-68, ISSN: 1223-6934.</b></p> <p>In aceste articole am demonstrat rezultate de existenta ale unor solutii homoclinice pentru o ecuatie cu diferente pentru <math>p(\cdot)</math>-Laplacian pe multimea numerelor intregi, ce contine o functie pondere coerciva si un termen ce satisface conditia Ambrosetti-Rabinowitz. Demonstratia se bazeaza pe teoria punctului critic combinata cu tehnici variationale adecvate bazate pe teorema "mountain pass".</p>
<p>Capacitatea candidatului de a îndruma studenți sau tineri cercetători și competențele didactice ale candidatului</p>	<p>Studentii si colegii din cadrul City University of Hong Kong, unde am predat seminariile a 4 cursuri pe parcursul anilor 2015-2017, m-au apreciat in mod deosebit atat din punct de vedere al competentelor didactice dar si din punctul de vedere al caracterului si spiritului colegial.</p> <p>De asemenea, am avut si o activitate de colaborare cu tineri cercetători. A se vedea articolul publicat cu doctorandul C. Udrea de la Scoala Doctorala de Stiinte din cadrul Universitatii din Craiova.</p>

Capacitatea  
candidatului de a  
îndruma studenți sau  
tineri cercetători și  
competențele  
didactice ale  
candidatului

Aprecierile unor distinsi profesori:

**1) Philippe G. CIARLET, University Distinguished Professor, College of Science & Engineering, City University of Hong Kong, Hong Kong.**

**<https://www6.cityu.edu.hk/ma/people/ciarlet/ciarlet.html>**

“Maria MALIN was my PhD student at City University of Hong Kong during three years, from September 2014 until now. She was awarded a “Hong Kong PhD Fellowship” in 2014, which constitutes an extremely rare and highly selective honor.

She just brilliantly got her PhD, the defense of which justly drew lots of praise from the examiners.

Maria Malin is obviously very gifted for mathematics and mathematical research, she is hard-working, learns fast, and has acquired a wide knowledge in linear and nonlinear functional analysis, partial differential equations, and differential geometry.

The theme of her PhD Dissertation was “Some new results about J.L. Lions lemma and Korn’s inequalities on surfaces”. In it, she derived beautiful new proofs for establishing a “vector version of J.L. Lions lemma” and new nonlinear Korn inequalities on surfaces, showing genuine mathematical abilities and creativity.

She is a particularly talented expositor, with excellent pedagogical qualities. As a person, she adapts herself very well to new environments and she interacts very easily with her colleagues.

For all these reasons, I am happy to very warmly recommend Maria Malin to your consideration for a position of Assistant Professor at the University of Craiova”.

**Hong Kong, June 1st, 2017**

**2) Patrizia PUCCI, Full Professor, Dipartimento di Matematica e Informatica Università degli Studi di Perugia, Italia, <http://www.dmi.unipg.it/pucci>**

“It is a great pleasure for me to write this letter to support Maria Malin for a position of Assistant Professor at the University of Craiova.

I first met Maria Malin in January–February 2016 during my visiting professor visit at the Department of Mathematics of the City University of Hong Kong, Kowloon, Hong Kong, at the invitation of Prof. P.G. Ciarlet. Then I closely followed her scientific activities, since I visited Romania several times and her name was often cited in the scientific meetings.

I was impressed with her ability to use the modern tools of variational techniques to study new challenging problems in nonlinear elliptic partial differential equations, as well as in Korn's inequalities on Riemannian surfaces. She solved the nonlinear vectorial case with great ability and brilliant new ideas.

Dr. Malin has already more than 10 papers in the areas of nonlinear functional analysis and partial differential equations published in journals of great impact. Her papers are focused on existence, local and global properties of solutions. Her results are so interesting, and her ingenious use of modern methods in order to overcome difficulties, led to collaborations with mathematicians of very high reputation, as Professors Ciarlet and Radulescu.

Moreover, in her recent papers on equations in elasticity she has made contributions to important questions arising from an extending work of many excellent mathematicians, some of them co-authors of the papers.

More recently, my attention was mainly attracted by her genuine interest in left open applied problems, as Korn's inequalities on surfaces. This topic is a keystone for existence and uniqueness of solutions to various linearly elastic shell problems. It is also clear that Dr. Malin has a wealth of significant ideas particularly in the development of fresh interests. That she will continue to do outstanding work in the future almost goes without saying. I therefore expect useful contributions to be made also in the important research areas connected with nonlinear analysis I mentioned above.

I am aware of the many other contributions which Dr. Malin has made to the field of nonlinear analysis, as well as her continuing efforts to guide students and to attract high level visitors to the mathematics program at her university.

Her curriculum vitae also details many further activities which fit very well with the main activities of the University of Craiova.

These are all the marks of a very distinguished career. It would be most deserved and most appropriate therefore to bestow upon her the position of Assistant Professor. The quality and variety of her scientific interests show the remarkable mathematical ability and maturity of Dr. Malin.

Moreover, the high level of her scientific collaborations show also the sincerest appreciation of her intellectual capacities. Finally, she has an inquiring and open mind and will provide unusual breadth of knowledge in the analysis field, which will be of particular value for teaching Ph.D. courses and introducing students to modern and interesting techniques.

Dr. Malin is an easy-going, optimistic and warm-hearted researcher, especially with strong sense of responsibility. She accomplishes her tasks with great initiative and with a very positive attitude. She can work independently and is able to follow through to ensure that the job gets done.

In summary, Dr. Malin has treated a number of difficult and interesting problems by means of original as well as technically involved methods, and has achieved important results and progress in many directions. I have attended several scientific talks and seminars given by Dr. Malin and her ability to present deep technical results in simple direct ways also shows her capacities as a good teacher.

Altogether, I offer my warmest and strongest support to Dr. Maria Malin for a position of Assistant Professor in Romania. In view of her strong background and high level of her present interests – as shown particularly in the description of her proposed research – she will fit in very well with the activities of the fine group of mathematicians now working at the University of Craiova in Romania.”

**Perugia, June 5, 2017**

**3) Cristinel MARDARE, Associate Professor, Laboratoire Jacques-Louis Lions, Université Pierre et Marie Curie (Paris VI), France, <https://www.ljll.math.upmc.fr/mardare/>**

“It is with great pleasure and great interest that I support Maria MALIN’s application for a position of assistant professor at the Department of Mathematics of the University of Craiova. This is due both to the quality of her mathematical abilities and to her personality.

I met Maria in September 2014, when she came to the City University of Hong Kong to prepare a Ph. D. thesis under the supervision of Professor Philippe Ciarlet. We started our collaboration shortly after and kept working together ever since, on two different subjects which I now describe. This collaboration has so far resulted in two published papers, one submitted for publication, and one manuscript that needs a final lecture before being submitted.

The first subject is about some fundamental results in Functional Analysis.

In 2015, Cherif Amrouche, Philippe Ciarlet and myself published a paper where we established an equivalence theorem between several fundamental results of functional analysis, among which there were Jacques- Louis Lions' lemma about the characterisation of the  $L^2$ -space as the set of distributions with partial derivatives in  $H^{-1}$ , Necas' inequality, de Rham theorem, and the surjectivity of the divergence operator between certain spaces. Maria began her thesis by studying whether this kind of result would also hold for vector fields when the gradient operator is replaced by its symmetric part, as needed in the theory of elasticity.

This study was successfully completed, and in a short time. In collaboration with Philippe Ciarlet and myself, Maria established an equivalence theorem showing in particular that a specific vector version of Lions' lemma, where only the symmetric part of the gradient of a vector field is required to belong to  $H^{-1}$ , a vector version of Necas inequality, Donati's theorem about the compatibility conditions satisfied by a matrix field if it is to be the image by the symmetrized gradient operator of a vector field, and a vector version of the surjectivity of divergence operator, are indeed equivalent.

The second subject is about nonlinear Korn inequalities in Differential Geometry of Surfaces.

In 2015, Philippe Ciarlet and myself established several nonlinear Korn inequalities for immersions from an open subset of  $R^n$  into  $R^n$ , showing that, under suitable conditions such as preservation of orientation and possibly boundary conditions, the  $W^{1,p}$ -distance between two immersions is bounded from above by the  $p/q$ -power of the  $L^q$ -distance between their metric tensor fields, where  $p > 1$  and  $q \geq 1$  are such that  $p/2 \leq q \leq p$ . Maria continued her thesis by studying whether this kind of inequalities could be established for immersions from an open subset of  $R^2$  into  $R^3$ , as needed in the nonlinear theory of elastic shells.



This study was also successfully completed, before the end of 2016. In collaboration with Philippe Ciarlet and myself, Maria Malin established several nonlinear Korn inequalities for surfaces showing that, under suitable conditions such as an uniform positive lower bound for the principal radii of curvature of the immersed surfaces, the  $W^{1,p}$ -distance between two immersions is bounded from above by the  $p/q$ -power of the sum of the  $L^q$ -distances between their first three fundamental forms. It is shown in addition that the third fundamental form can be dropped from the right hand side of these inequalities if the eigenvalues of the metric tensor field belong to a compact subset of  $(0, \infty)$ .

The variety of her research activities and the quality of her publications show that Maria Malin has an excellent mathematical background, particularly in functional analysis, is very gifted and hardworking, and possesses an impressive scientific dynamism.

I was particularly impressed by her ability to acquire in such a short time a mastery of the differential geometry of surfaces together with applications in elasticity. She become very rapidly operational, had many research ideas, as well as the computational and analytical skills to follow them through.

Besides, Maria Malin is an excellent lecturer, who expresses ideas very clearly and manages presentation time very intelligently. I was particularly impressed with her presentation of the results from our paper about the nonlinear Korn inequalities on a surface at the 9th European Conference on Elliptic and Parabolic Problems in Gaeta, Italy, in May 2016. The subject is difficult to present to a mainly PDE oriented audience because of the many preliminaries of differential geometry of surfaces needed to state the problem and results, but she managed to do this very well, and was also very clear in answering the questions from the audience.

I would like to emphasise that Maria completed all the above research activities and defended her Ph. D thesis in less than three years, which is remarkable, especially considering that she had weekly teaching duties and also had to attend graduate courses and take exams.

During my visits to the Department of Mathematics of the City University of Hong Kong, I learned that she is a very competent and conscientious teacher, very appreciated by staff and students alike.

	<p>Finally, regarding her personality, Maria is a very agreeable, considerate and trustworthy person. She is always pleasant, positive, and a very efficient collaborator.</p> <p>For all these reasons, I believe that Maria Malin is very strong candidate for the aforementioned position of Assistant Professor. I give her my enthusiastic recommendation with the certainty that you will be very happy to have her in your Department and Faculty.”</p> <p><b>Paris, June 6, 2017</b></p>
Capacitatea candidatului de a conduce proiecte de cercetare-dezvoltare	<p>Sunt membra in cadrul proiectului de cercetare CNCS-UEFISCDI: <i>Controlabilitate si probleme de optimizare</i>, PN-II-RU-TE-2014-4-1109.</p> <p>Tinand cont de bogata experienta internationala, de aprecierile si distinctiile (premiile) obtinute consider ca voi avea sanse reale de a castiga proiecte de cercetare în calitate de director de proiect in competitile de tip Post-Doc sau Tinere Echipe desfasurate sub egida Consiliului National al Cercetării Stiințifice.</p>

#### 6. **Îndeplinirea standardelor universității:**

- deține diploma de doctor în domeniul postului sau într-o ramură înrudită: **îndeplinit**;
- o medie minima a anilor de studii universitare stabilita de Consiliul facultatii, dar nu mai mica de 8:00: **îndeplinit (Media anilor de studii universitare este: 9,68)**
- Sa fi publicat minim 3 lucrari (articole, studii) in reviste de specialitate clasificate de CNCSIS in categoriile A, B sau C sau in volume ale unor manifestari stiintifice nationale sau internationale, conform CV-ului: **îndeplinit (candidatul a publicat 9 articole)**

Indicatori de performanță	Nr. min. realizări	Nr. realizări candidat
Lucrări (articole/studii) publicate în reviste de specialitate clasificate de CNCSIS în categoriile A, B sau C sau în volume ale unor manifestări științifice naționale sau internaționale	3	9

#### 7. **Îndeplinirea standardelor facultății: îndeplinit.**

Data: 12.06.2017

Semnătura candidatului,  
Dr. Maria Mălin