

## CURRICULUM VITAE

DANIELE FAENZI

### Personal informations

- Born on 29/10/1974 in Rome - Italy.
- Maître de conférence at UPPA, Université de Pau et des Pays de l'Adour, since le 01/09/2007.  
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E-mail: [daniele.faenzi@univ-pau.fr](mailto:daniele.faenzi@univ-pau.fr), url: <http://www.univ-pau.fr/~dfaenzi1>
- Member of algebra and geometry team in of LMA in PAU. UMR CNRS 5142.
- CNU section 25 (mathematics).

### Qualifications

**Ph.D. Thesis.** I defended my Ph.D. thesis on 30/09/2003.

- Title: *Vector Bundles over Fano Varieties*.
- Thesis advisor: Giorgio Ottaviani, Univ. Firenze.
- Dissertation committee: Giuseppe Tomassini (Scuola Normale Superiore di Pisa), Pier Luigi Papini (Univ. Bologna), Giorgio Busoni (Univ. Firenze).
- My thesis obtained a special mention for *F. Enriques prize*. Prize committee: C. Ciliberto (Univ. Roma 1), M. Franciosi (Univ. Pisa), F. Ghione (Univ. Roma 2), E. Vesentini.

**Laurea.** I obtained the Laurea in Matematica (master) on 30/11/1999 (Univ. Padova).

### Publications

#### Journal articles.

1. *Hyperplane arrangements of Torelli type*, with DANIEL MATEI and JEAN VALLÈS. *Compositio Mathematica*, in press (2012).
2. *Rank 2 stable sheaves with odd determinant on Fano threefolds of genus 9*, with CHIARA BRAMBILLA. *Mathematische Zeitschrift*, in press (2012).
3. *Moduli spaces of rank 2 ACM bundles on prime Fano threefolds*, with CHIARA BRAMBILLA. *Michigan Mathematical Journal* 60 (2011), no. 1, 113-148.
4. *Skew-symmetric matrices and Palatini scrolls*, with MARIA LUCIA FANIA. *Mathematische Annalen*, 347 (2010), no. 4, 859-883.
5. *Rank 2 arithmetically Cohen-Macaulay bundles on a general quintic surface*, with LUCA CHIANTINI. *Mathematische Nachrichten*, 282 (2009), no. 12, 1691-1708.
6. *On general surfaces defined by an almost linear Pfaffian* with LUCA CHIANTINI. *Geometriae Dedicata* 142 (2009), 91-107.
7. *Rank 2 arithmetically Cohen-Macaulay bundles on a nonsingular cubic surface*. *Journal of Algebra* 319 (2008) 143-186.

8. *Homogeneous instanton bundles on  $\mathbf{P}^3$  for the action of  $SL(2)$* . *Journal of Geometry and Physics* 57 (2007) no. 10. 2146–2157.
9. *Bundles over Fano threefold of type  $V_{22}$* . *Annali di Matematica Pura e Applicata* 186 (2007) no. 1. 1–24.
10. *Vector bundles with no intermediate cohomology on Fano threefolds of type  $V_{22}$* , with ENRIQUE ARRONDO. *Pacific Journal of Mathematics* 225 (2006) no. 2, 201–220.
11. *Cohomology of Tango Bundle on  $\mathbb{P}^5$* . *Boll. Unione Mat. Ital. Sez. B Artic. Ric. Mat.* (8) 9 (2006), no. 2, 319–326.
12. *Bundles over the Fano threefold  $V_5$* . *Communications in Algebra* 33, No. 9, 3061-3080 (2005).
13. *A geometric construction of Tango bundle on  $\mathbb{P}^5$* . *Kodai Math. J.* 27 (2004), no. 1, 1–6.
14. *A small resolution for triple convers in algebraic geometry*, with JANIS STIPINS. *Le Matematiche (Catania) LVI* (2001) II pp. 257–267.

### Preprints.

1. *Vector bundles on Fano threefolds of genus 7 and Brill-Noether loci*, with CHIARA BRAMBILLA. Under revision at *Journal of Algebraic Geometry*, (2012).
2. *On the derived category of the Cayley plane II*, with LAURENT MANIVEL, under revision at *Proceeding of the American Mathematical Society* (2012).
3. *A refined stable restriction theorem for vector bundles on quadric threefolds*, with IUSTIN COANDA, under revision at *Annali di Matematica Pura e Applicata* (2012).
4. *Logarithmic bundles and Line arrangements, an approach via the standard construction*, with JEAN VALLÈS. Submitted preprint, arXiv:1209.4934 (2012).
5. *Linear spaces of matrices of constant rank and instanton bundles*, with ADA BORALEVI and EMILIA MEZZETTI. Submitted preprint, arXiv:1207.6299 (2012).
6. *Even and odd instantons on Fano threefolds of Picard number 1*. Submitted preprint, arXiv:1109.3858 (2011).
7. *On the Hilbert scheme of determinantal subvarieties*, with MARIA LUCIA FANIA. Submitted preprint, arXiv 1012.4692 (2010).
8. *Moduli space of a family of homogeneous self-dual bundles on  $\mathbb{P}^2$* , with OSKAR KEDZIERSKI. *Quaderno del Dipartimento Ulisse Dini*, (2005).
9. *A simple vanishing theorem for twisted holomorphic forms on Hermitian symmetric varieties*, with CARLA DIONISI. *Quaderno del Dipartimento Ulisse Dini* (2004).

### Proceedings.

1. *Freeness of line arrangements with many concurrent lines*, with JEAN VALLÈS. *Eleventh International Conference Zaragoza-Pau on Applied Mathematics and Statistics*, 133-137, *Monogr. Mat. García Galdeano*, 37, *Prensas Univ. Zaragoza*, Zaragoza (2012).
2. *Moduli spaces of arithmetically Cohen-Macaulay bundles on Fano manifolds of the principal series*, with CHIARA BRAMBILLA. *Boll. Unione Mat. Ital.* (9) 2 (2009), no. 1, 71–91.
3. *A Remark on Pfaffian Surfaces and aCM Bundles* *Vector bundles and low codimensional subvarieties: state of the art and recent developments*, 209-217, *Quad. Mat.*, 21, *Dept. Math.*, *Seconda Univ. Napoli, Caserta* (2007).

## Responsibilities

**Research projects.**

- I am in charge for Pau's node of ANR BLANC GEOLMI, funded in 2011 for 4 years, principal investigator: D. Henrion (LAAS, Toulouse). Funding amount: 420K euro, (67K for Pau's node).
- I contributed to the submission of ANR JEUNE CHERCHEUR INTERLOW, principal investigator V. Florens (UPPA), funded in 2009 for 4. Funding amount: 70K euro.
- In 2008, I contributed to the organization of PEPS GEOLMI, principal investigator D. Henrion (LAAS, Toulouse), funded by CNRS.

**Thesis supervision and doctoral teaching.**

- I co-supervise the Ph.D. thesis of F. Tanturri, SISSA, Trieste, (advisor F. Bruzzo, in collaboration with E. Mezzetti). Dissertation to hold in 2014.
- I co-supervise the Ph.D. thesis of E. Angelini (main advisor G. Ottaviani, Firenze, dissertation to hold in 2013).
- In September 2012, I gave a series of lectures as tutor at the autumn school *School (and Workshop) on Invariant Theory and Projective Geometry* in Trento, with G. Ottaviani and L. Manivel.
- In September 2009, together with L. Costa (Universitat de Barcelona), G. Ottaviani (Università di Firenze) and R.M. Miró-Roig (Universitat de Barcelona) we supervised the 4-weeks summer school in algebraic geometry PRAGMATIC, in Catania (Italy). The title of 2009's edition was *Vector bundles, from classical techniques to new perspectives*. The students wrote 6 research papers devoted to the problems proposed during the school, published on the special volume *Matematiche (Catania) 64 (2009)*, no. 2. Here are the titles of the articles.
  - *On the non-existence of orthogonal instanton bundles on  $\mathbf{P}^{2n+1}$*  by L. Farnik, D. Frapporti, S. Marchesi;
  - *Splitting types of semistable bundles on  $\mathbf{P}^r$*  by M. Farnik, A. Stabler;
  - *Derived category of toric varieties with Picard number three* by A. Dey, M. Lason, M. Michałek;
  - *Derived categories of Fano 3-fold via the Frobenius morphism* by A. Bernardi, S. Tirabassi;
  - *Splitting criterion for vector bundles on the isotropic grassmannian* by P. Macias Marque, L. Oeding;
  - *ACM Bundles on del Pezzo Surfaces* by J. Pons Llopis, F. Tonini.
- In 2011 and 2012, I gave a series of talks on duality of projective varieties and homogeneous spaces at the PTT seminar.
- From 2010 to 2012, I delivered several lecture series, in particular in Padova and Florence, mainly concerning logarithmic sheaves and line arrangements.
- In 2006, I was invited at UPPA to give a series of lectures on *Introduction to rational surfaces*.

**Organization of conferences, workshops and summer schools.**

- In June 2012, I organized with E. Artal (Zaragoza), J. I. Cogolludo (Zaragoza), D. Matei (IMAR Bucharest), V. Florens (UPPA), J. Vallès (UPPA), the school and workshop *Arrangements in Pyrénées*. We had around 80 participants. The school consisted of 5

- lecture series, delivered by E. Artal (Zaragoza), L. Paris (Bourgogne), G. Denham (Western Ontario), A. Suciú (Northeastern) and M. Yoshinaga (Kyoto).
- In December 2010 I co-organized *Tresses d'Hiver; Ecole sur les aspects algébriques et topologiques des groupes de tresses*, with P. Bellingeri (Caen), V. Florens (UPPA), J. Vallès (UPPA) et L. Paris (Bourgogne). We had 50 participants. The lectures took place in Pau, and were given by S. Baader (Berne), P. Bellingeri (Caen), A. Cattabriga (Bologna), V. Florens (UPPA) and I. Marin (Paris VII).
  - In October 2009 I co-organized *Tresses in Pau, Première École Franco-Espagnole Groupes de tresses et topologie en petite dimension*, with V. Florens (UPPA), J. Vallès (UPPA) and L. Paris (Bourgogne). We had 60 participants. The lectures were given by G. Mas-suyeau (Strasbourg, CNRS), J. I. Cogolludo (Zaragoza), and Juan González-Meneses (Sevilla).
  - In November 2009 I co-organized the workshop GEOLMI at LAAS (Toulouse), with D. Henrion (LAAS, Toulouse), J. Vallès (UPPA), R. Hildebrand (LJK-CNRS Grenoble) and J. Malick (LJK-CNRS Grenoble).
  - Since 2008, I organized the *Rencontres transfrontalières d'algèbre et géométrie*, on a basis of one meeting every 6 months. The edition of spring 2011 took place in Bayonne, in the framework of *Ateliers thématiques Bilbao-Pau-Zaragoza*.
  - Since 2012, I organize the *Séminaire PTT Pau-Tarbes-Toulouse*, with B. Bertrand (Tarbes), T. Dedieu (Toulouse) and J. Vallès (UPPA). We had 9 meetings so far, with more than 20 talks by, among others, A. Beauville, C. Pauly, A. Ortega, M. Bolognesi, P. E. Chaput, C. Peskine, L. Pirio, O. Wittenberg, L. Gruson, F. Han.
  - I organize with V. Florens and J. Vallès the new seminar of the algebra and geometry team in Pau. We had so far more than 30 talks since 2008. In 2010-2012, we had a thematic seminar on *arrangements of hyperplanes*. We invited upon this subject D. Matei (IMAR, Bucharest), on a CNRS fellowship (2009).
  - I organized the lecture series *Algèbres de Lie* given by A. Elduque (Zaragoza) at UPPA in 2008.

### Other responsibilities.

- I am member of the recruitment committee of Université de Poitiers.
- I am in charge of Erasmus program for mathematics in PAU since 2008. I contributed to open up several exchange programs, with Università di Firenze, Università della Calabria, l'Universitat de Barcelona et l'Universitat Autònoma de Barcelona (Espagne), especially in view of joint thesis.
- In 2008, I collaborated to write up the programs of the program of master in mathematics at UPPA.
- I obtained with my team, several mid-term invitations of foreing researchers from 2007 and 2010: I. Coanda (IMAR Bucarest), S. Bigelow (California Santa Barbara), Polizzi (Cosenza), E. Artal (Zaragoza), A. Elduque (Zaragoza), A. Garcia (Penn State), C. Brambilla (Ancona), D. Matei (IMAR Bucarest), M. Marco (Zaragoza). These invitations were partially supported by l'UPPA, and partially from GRIFGA (groupement de recherche Franco-Italien) INDAM, CNRS, and ANR.
- I reviewed from 2007 several research papers and two Ph.D. thesis.
- I am a reviewer of Mathematical Reviews Database.

## Teaching

In Pau, I have been teaching the following modules:

1. *Algèbre et géométrie* (Master 1, 2007-2012, course and exercises). Course devoted to notions in algebra and geometry, such as Sylow theorems, representation theory of finite groups, field extensions and Galois theory, invariant theory, rings and modules.
2. *Algèbre bilinéaire* (second year, 2007-2012, course and exercises). Main course in algebra of second year in mathematics at UPPA, devoted to bilinear and quadratic forms, orthogonal groups, Gauss and Gram-Schmidt reductions, rotations and isometries in  $n$  dimensions, decompositions into products of reflections, Hermitian forms, unitary groups, normal endomorphisms.
3. *Variable complexe* (third year, 2009-2010, course). Introductory course in complex analysis, devoted to power series expansions and analytic functions of one complex variable, Cauchy-Riemann conditions and holomorphic functions, differential forms and integration along smooth paths, Cauchy formula, residue theorem.
4. *Analyse II* (APILS, 2010, course and exercises).
5. *Algèbre* (APILS, 2007-2009, course and exercises).
6. *Méthodologie du calcul des probabilités* (first year, 2007-2009, course and exercises).
7. *Mathématiques générales* (first year, 2007-2010, course and exercises).

Between 2008 and 2011, I supervised several *mémoires* of third (L3) and fourth year (M1), for instance:

- *Arrangement d'hyperplans* (M1, École Normale Supérieure, Rennes),
- *Courbes algébriques et théorème de Poncelet* (M1 UPPA).
- *Classification des surfaces topologiques* (L3 UPPA).

Between 2005 and 2007, at Università di Firenze, I taught:

- *Istituzioni di Geometria Superiore*, (third year, (2005-2007), exercises; course given by G. Gentili). This course is devoted to the basic notions of algebraic topology, such as fundamental group and homology, with applications to the classifications of compact connected surfaces.
- *Geometria I*, (first year in engineering 2005-2007, exercises; course given by L. Verdiani).
- *Matematiche Complementari* (second year, 2005-2007, exercises; course given by A. Dolcetti). Commutative algebra from a computational point of view.

## Talks and invitations

**Selected conference talks.**

1. (5/2012) *On the derived category of the Cayley plane*. Workshop “Derived Categories in Algebraic Geometry”, Dijon.
2. (6/2012) *Freeness of line arrangements with many concurrent lines*, School and Workshop “Arrangements in Pyrénées”.
3. (12/2011) *On the derived category of the Cayley plane*. Groupe de travail ANR *Nouvelles symétries en théorie de Gromov-Witten*, Poitiers.
4. (11/2011) *Determinantal varieties, some results and conjectures*. Workshop GEOLMI, Rennes.

5. (12/2010) *Odd instantons on Fano threefolds*, Workshop *Instantons and Rationality of Moduli Spaces*, Freie Universität Berlin.
6. (06/2010) *Dolgachev's conjecture on logarithmic sheaves*, Workshop *Journées Paloises de Géométrie Algébrique*, Pau.
7. (04/2010) *Triples planes and Steiner bundles*, Rencontre d'algèbre et géométrie Pau-Saragosse, Zaragoza.
8. (11/2009) *Variétés déterminantales*, visite AERES au LMA de Pau.
9. (03/2008) *Moduli spaces of bundles on anticanonical threefolds*, au Workshop *Moduli spaces of vector bundles: algebro-geometric aspects*, Universitat de Barcelona.
10. (01/2008) *Espaces de modules de fibrés sur 3-variétés de Fano de genre 7 et 9*. Rencontre de Géométrie algébrique, C.I.R.M. (Luminy).
11. (09/2007) *Spazi di moduli di fasci aCM su 3-varietà anticanoniche*. Cet exposé a eu lieu dans le cadre des invitations jeunes chercheurs INDAM du XVIII Congresso Unione Matematici Italiani, Bari.
12. (09/2006) *ACM bundles on surfaces in  $\mathbb{P}^3$* , workshop *Vector bundles and low-codimensional subvarieties*, CIRM (Trento).

I gave more talks at seminars and workshops, for instance at:

- Paris, Brest, Toulouse, Roma, Padova, l'Aquila, Trieste (between and 2012-2011);
- Berlin, Barcelona, Grenoble, Torino, Salamanca, Trento (between 2010 and 2007).

#### Invitations

- \* In April 2011 I was invited at Università di Padova by F. Bottacin, to work on logarithmic sheaves and bundles on non-commutative curves.
- \* In September 2010 I was invited at Universitat de Barcelona to collaborate with L. Costa on moduli of vector bundles.
- \* In October 2010 I was invited at Université de Grenoble to work with L. Manivel and A. Chiodo on homological projective duality, in the framework of the ANR project *Nouvelles symétries pour la théorie de Gromov-Witten*.
- \* In February 2009 I was invited at Università di Roma III to work with S. Verra on Fano threefolds of low genus, in particular double covers of the projective space.
- \* In March 2006 P.-E. Chaput invited me at Université de Nantes to study moduli spaces of bundles on cubic surfaces.
- \* In March 2005 I was invited at Universidad de Salamanca by B. Graña to study restrictions of bundles to hyperplane sections of congruences of lines.
- \* In September 2004, Oskar Kedzierski invited me at Uniwersytet Warszawski to study moduli spaces of quiver representations.
- \* In May 2003, I spent a period at Universidad Complutense de Madrid in the framework of *Azione integrata Italia-Spagna* to work with E. Arrondo.
- \* In 2002, I obtained a fellowship from EAGER to spend a period at Universitat de Barcelona and collaborate with L. Costa and R. M. Miró-Roig.