Matteo Villa

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Dettagli personali

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Metrica (Scopus)

Documenti: 56
Citazioni: 789
Indice H.: 18

Titoli di studio principali

2014 PhD degree, Università tecnica della Danimarca, DK, con tesi "Isothermal martensite".

2010 MSc doppia laurea in Ingegneria dei Materiali, Politecnico di Milano e Politecnico di Torino.

Esperienza lavorativa

2024 — Professore associato di Metallurgia, dipartimento di Meccanica, Matematica e Management, Politecnico di Bari, PoliBa-DMMM.

2019 — 2024 Ricercatore senior (permanente, livello di Professore Associato), dipartimento di Ing. Civile e Meccanica, Università Tecnica della Danimarca, DK, DTU-CME.

2017 — 2019 Ricercatore (tenure-track, livello di Professore Assistente), dipartimento di Ing. Meccanica, Università Tecnica della Danimarca, DK, DTU-MEK.

2013 — 2017 Postdoctoral researcher, DTU-MEK.

Abilitazioni e certificazioni pedagogiche

2023 Abilitato a "Professore di II fascia" nel settore scientifico disciplinare IIND-03/C Metallurgia.

2023 Certificato come responsabile di corsi universitari: The University Teacher Training Programme at DTU.

2021 Certificato come supervisore di PhD: Supervision of PhD Students at DTU.

Responsabilità scientifica ed amministrativa

2025 — Membro della "Commissione ricerca" del Dipartimento di Meccanica, Matematica e Management per il settore scientifico disciplinare IIND-03/C Metallurgia.

2025 — Responsabile scientifico del laboratorio "***Metallografia e Microscopia"***, PoliBa-DMMM.

2025 — Responsabile scientifico del laboratorio "***Simulazione fisica di processi tecnologici",*** PoliBa-DMMM.

Responsabilità di progetto come principal investigator PI

2026 — **Responsabile scientifico** per il progetto conto terzi "***Studio del processo di Nitrurazione al Plasma con post ossidazione***" del valore di 120 K€.

2020 — 2024 **PI e proponente** per il progetto di ricerca nazionale "***Superelastic Titanium alloys for orthopedic applications***", finanziato con ~400 K€ per 3.5 anni.

2014 — 2017 **PI e proponente** per il progetto di ricerca nazionale "***Martensitic transformation in metastable austenitic stainless steels***", finanziato con ~300 K€ per 2.5 anni.

Partecipazione in progetti di ricerca

2026 — Responsabile scientifico di due working packages WP sullo studio dei materiali nel progetto conto terzi "*HVO fuel analysis and H2 usage evaluation for naval GT" / ID Controls&Electrification*". Responsabile: Prof. Sergio Camporeale, PoliBa DMMM.

2025 — Collaboratore per "*Lightweight and Crashworthy Lattice Structures in Fe-Based Shape Memory Alloys by PBF-LB for Automotive Safety Applications*", progetto PoC nazionale finanziato entro il programma NextGenerationEU. Responsabili per PoliBa: Dr. Emanuela M. Palmieri e Dr. Ester D'Accardi, Poliba-DMMM.

2024 — Ricercatore per "*MANAGE 5.0 - MANufacturing Automotive Green Evolution 5.0*", Progetto nazionale finanziato entro il programma Horizon EU. Responsabile per PoliBa: Prof. Luigi Tricarico, PoliBa-DMMM.

2024 — Ricercatore e **co-proponente** per "*Green options for sustainable exploitation of iron ore reserves in Uganda*", progetto in collaborazione con il ministero per la Scienza, la tecnologia e l'innovazione dell'Uganda. Responsabile: Prof. Marcel Somers, DTU-CME.

2021 — 2024 Co-supervisore in "*In situ martensite formation*", progetto finanziato entro l'investimento nazionale in infrastruttura strategica per l'uso di neutroni e luce di sincrotrone nelle tecniche di imaging. Responsabile: Prof. Marcel Somers, DTU-CME.

2020 — 2024 Ricercatore e **co-proponente** per "*Breaking the strength-ductility paradox by stacking fault energy design*", progetto nazionale di ricerca fondamentale. Responsabile: Prof. Marcel Somers, DTU-CME.

2017 — 2022 Ricercatore in "*WhiteWind: White Etching Crack bearing failures in wind turbines*", progetto internazionale finanziato entro il programma Horizon EU e guidato da DTU. Responsabile per DTU-CME: Prof. Thomas L. Christiansen.

2018 — 2021 Co-supervisore in "*Thermochemical Treatment of titanium and titanium alloys*" progetto entro il perimetro di un progetto nazionale di ricerca fondamentale. Responsabile: Prof. Thomas L. Christiansen, DTU-CME.

2017 — 2020 Ricercatore e co-supervisore in "*Surface engineering of ZrCuAl-based bulk metallic glasses by gaseous oxidizing*", progetto finanziato entro il perimetro di una iniziativa nazionale guidata dall'Università di Aalborg, DK. Responsabile per DTU: Prof. Marcel Somers, DTU-CME.

2014 — 2024 Ricercatore in numerosi progetti nazionali ed internazionali conto terzi o in attività di ricerca e sviluppo industriale congiunto con le aziende e guidati dai Prof. Marcel A.J. Somers e/o Thomas L. Christiansen.

Attività associative, premi e inviti

2026 — **Membro di comitato tecnico** "Trattamenti termici e Metallografia" dell'associazione Italiana di Metallurgia AIM.

2024 — **Membro di comitato scientifico** di eventi internazionali: (i) ECHT 2027 & 32nd IFHTSE World Congress, Milano, IT; (ii) 4th Mediterranean Conference on Heat Treatment and Surface Engineering 2024, Lecce, IT.

2016 — **Relatore invitato**: (i) Giornata di studio AIM *High-Strength Steels. Properties, Applications and the Future*, Vicenza IT, 2026; (ii) "Metallic Microstructures European Lecture Online", 2022; (iii) 25th IFHTSE Congress, Xian CN, 2018, (iv) 24th IFHTSE Congress, Nice FR, 2017, (v) Giornata di studio AIM *Tecniche innovative di indurimento superficiale e trattamento criogenico degli acciai*, Trento IT, 2016.

2024 — 2025 **Affiliated / Guest Associate Professor** a DTU-CME per un periodo di ~9 mesi

2016 **Tom Bell Young Author Award**, premio della International Federation of Heat Treatment and Surface Engineering IFHTSE per il miglior lavoro presentato al Congresso mondiale da un ricercatore con meno di 35 anni.

2014 — 2015 **Visiting Postdoctoral researcher** al Max Planck Institute for Intelligent Systems, Laboratorio Mittemeijer, Stoccarda, DE, per un periodo di ~3 mesi.

2014 Young Researchers Award, premio di DTU per le migliori tesi di PhD, premio conferito a ~1% dei volumi.

2012 Visiting PhD student all'Università di Rostock, per un periodo di ~1 mese.

Esperienza di docenza universitaria

2025 — Responsabile di ***Laboratorio di Metallurgia***: livello BSc, 6 ECTS, offerto in italiano a PoliBa-DMMM.

2024 — Responsabile di ***Green and Sustainable metallurgy***: livello MSc, 6 ECTS, offerto in inglese a PoliBa-DMMM.

2024 — Responsabile di ***Metallurgia***, partizione L-Z: livello BSc, 6 ECTS, offerto in italiano a PoliBa-DMMM.

2023 ─ 2024 Responsabile di ***Materials technology***: livello BSc, 5 ECTS, offerto in inglese a DTU-CME. La mia responsabilità come docente era relativa alla parte di materiali metallici, ~35% del corso.

2022 ─ 2024 Docente di ***Materials characterization and testing***: livello BSc, 5 ECTS, offerto in inglese a DTU-CME (Responsabile: Prof. Marcel A.J. Somers). La mia responsabilità riguardava l'attività di laboratorio, ~20% del corso.

2018 ─ 2024 Responsabile di ***Design-Build 3: solar oven***: livello BSc, 5 ECTS, offerto in inglese a DTU. La mia responsabilità era relativa a selezione dei materiali e ingegneria delle superfici, ~30% del corso.

2011 ─ 2018 Assistente in ***Project course in materials engineering***: offerto in inglese, livello MSc a DTU-CME, precedentemente BSc a DTU-MEK.

2013 ─ 2014 Assistente in ***Physical metallurgy***, livello MSc, al tempo 5 ECTS, offerto in inglese a DTU-MEK.

Pubblicazioni, supervisione e servizi alla comunità scientifica

Autore di **44 publicazioni ISIJ,** 14 come primo autore, 3 come ultimo autore, 1 su Nature Materials (IF 38), 1 su Journal of Materials Science & Technology (IF 16.8), 5 su Acta Materialia (IF 10.7)), **1 capitolo di libro** e 23 pubblicazioni peer-reviewed in Proceedings di conferenze internazionali.

Supervisore di 30+ tra progetti finali BSc e MSc e tirocini di ricerca, di **5 tesi di PhD** e di 30+ progetti individuali ultimati con successo. Attuale membro esterno di commissione per 2 tesi di PhD (Makerere Uni., UG, e WPI, US).

Reviewer con 50+ reviews verificate per 20+ ISIJ.

Esaminatore di lavori di PhD/dottorato: 4 volte (3 a DTU-CME, 1 a LUT, FI) opponente in sede di esame finale; 2 volte (1 per LUT, FI; 1 per PoliBa, IT) pre-esaminatore di tesi.

Innovazione

Autore di **2 richieste di brevetto**, 1 delle quali, data in licenza, ha generando un ritorno economico.

Altre attività degne di menzione

2025 ─ Docente per il corso "Tecnologia dei materiali e trattamenti", per ITS Cuccovillo, Bari / varie sedi, IT.

2022 ─ 2024 Tutor accademico per il programma interdisciplinare livello BSc "General Engineering" a DTU e tra i riferimenti accademici per il percorso di studio in materiali avanzati.

2018 ─ 2024 Responsible per il programma di seminari interdisciplinari a DTU-CME, sezione materiali e superfici.

2012 ─ Full member (now alumni) del Board of European Students of Technology BEST.

2008 ─ 2009 Rappresentante degli studenti per il Consiglio della facoltà di Ing. Chimica e dei Materiali del Politecnico di Milano entro la lista apolitica "Svolta studenti", che contribuii a fondare.

Lista completa di attività di disseminazione

Publicazioni in International Scientific Indexed journals, ISIJ:

[1] M.E. Palmieri, C.M. Puro, M.M. Tedesco, G. Macoretta, **M. Villa**, L. Tricarico, "*Effects of Resistance Spot Welding HAZ Thermal Cycles on a Third-Generation Quenching and Partitioning Steel: An Integrated Approach via Physical Simulation and Industrial Welding Validation*", J. Mater. Eng. Perform. (2026)

[2] M.E. Palmieri, **M. Villa**, G. Macoretta, M.M. Tedesco, L. Tricarico, "*HAZ Evolution in PHS1500 and Q&P1180 Steels Under Resistance Spot Welding Thermal Cycles*", Metals 16:8 (2026) 909

[3] **M. Villa**, M.A.J. Somers, "*Lattice distortion activates deformation twinning in ultrastrong steel*", **Nature Materials** (2026)

[4] B. Aymans, I. Goni, D. Jakobi, **M. Villa**, M.A.J. Somers, "*Evaluation of the Corrosion Resistance of Heat Resistant Cast Alloys in Ammonia Containing Atmospheres: The Role of Oxide Scales*", Mater. Corrosion 0 (2025) 1-15

[5] M.E. Palmieri, **M. Villa**, L. Tricarico, "*Analysis of the rapid tempering treatment on a high-strength boron steel in the martensitic state through physical simulation*", Metall. Ital. 7 (2025) 7-15

[6] M.E. Palmieri, **M. Villa**, L. Tricarico, "*Microstructure and Properties of Low- and Medium-C Press-Hardened Steels During Hot Stamping with Intermediate Pre-cooling Stage Tailored Process*", Metall. Mater. Trans. 56A (2025) 1749–1760

[7] K.V., Werner, M. Tsikh, F.B. Grumsen, T.L. Christiansen, M.A.J., Somers, **M. Villa**, "*Ultrafine-grained high-interstitial martensitic stainless steel via thermochemical processing*", Mater. Charact. 223 (2025) 114913

[8] K., Gama Sales de Souza, K. Pantleon, F.B. Grumsen, R. Caram, **M. Villa**, "*In-situ investigation of phase transformations in Ti-Nb-Zr alloys by simultaneous synchrotron diffraction and dilatometry*", J. All. Com. 1024 (2025) 180199

[9] Y. Meng, N.G. Henriksen, **M. Villa**, K.V. Dahl, M.A.J. Somers, T.L. Christiansen, "*Gaseous carbo-oxidizing of Ti-6Al-4V: On the role of initial microstructure*", J. Mater. Sci. Eng. A 926 (2025) 147933

[10] B. Milkereit, C. Rowolt, D. Chatterjee, R. Holmestad, R. Bjørge, **M. Villa**, F. Niessen, A. Stark, F. De Geuser, O. Kessler, "*On the precipitation and transformation kinetics of precipitation-hardening steel X5CrNiCuNb16-4 in a wide range of heating and cooling rates*", Materialia 38 (2024) 102254

[11] K.V. Werner, M. Naeem, F. Niessen, L. Zhu, M. **Villa**, X-L Wang, M.A.J. Somers, "*Experimental and computational assessment of the temperature dependency of the stacking fault energy in face-centered cubic high-entropy alloys*", Acta Mater. 278 (2024) 120271

[12] F. Niessen, K.V. Werner, W. Li, S. Lu, L. Vitos, **M. Villa**, M.A.J. Somers, "*Efficient ab initio stacking fault energy mapping for dilute interstitial alloys*", Comp. Mater. Sci 231:112542 (2024) 1-11

[13] H.K. Danielsen, **M. Villa**, F. Gutiérrez Guzmán, S. Fæster, K.V. Dahl, R.H. Vegter, O.L. Jensen, T.S. Hummelshøj, B. Lehmann, G. Jacobs, M.A.J. Somers, T.L. Christiansen, "*New White Etch Cracking resistant martensitic stainless steel for bearing applications by high temperature solution nitriding*", Wear 534-535:205134 (2023) 1-10

[14] **M. Villa**, F.B. Grumsen, F. Niessen, T. Dahmen, L. Cao, M. Reich, O. Kessler, X. Huang, M.A.J. Somers, "*Aging 17-4 PH martensitic stainless steel prior to hardening: effects on martensitic transformation, microstructure and properties*", Materialia, 32: 101882 (2023) 1-13

[15] F. Niessen, W. Li, K.V. Werner, S. Lu, L. Vitos, **M. Villa**, M.A.J. Somers, "*Ab initio study of the effect of interstitial alloying on the intrinsic stacking fault energy of paramagnetic γ-Fe and austenitic stainless steel*", Acta Mater., 253 (2023) 118967

[16] K.V. Werner, F. Niessen, W. Li, S. Lu, L. Vitos, **M. Villa**, M.A.J. Somers, "*Reconciling experimental and theoretical stacking fault energies in face-centered cubic materials with the experimental twinning stress*", Materiala, 27 (2023) 101708

[17] B. Wang, K.V. Werner, **M. Villa**, T.L. Christiansen, M.A.J. Somers, "*Phase stability and deformation modes in functionally graded metastable austenitic stainless steel; a novel approach to evaluate the role of nitrogen*", Metall. Mater. Trans. A, 54 (2023) 590-604

[18] H. Mahdavi, O.C. Kucukyildriz, K.V. Dahl, M.A.J. Somers, K. Poulios, T.L. Christiansen, **M. Villa**, "*Rapid screening of the mechanical properties of 13 wt%Cr steels with uncharted combinations of C and N contents*", J. Heat Treat. Mater. 77:5 (2022) 336-356

[19] K.V. Werner, F. Niessen, **M. Villa**, M.A.J. Somers, "*Experimental validation of negative stacking fault energies in metastable face centered cubic materials*", APL 119:6 (2021) 141902

[20] Y. Meng, **M. Villa**, K.V. Dahl, B. Wang, M. Drouet, J.B. Dubois, M.A.J. Somers, T.L. Christiansen, "*Thermochemical surface hardening of Ti-6Al-4V: On the role of temperature and treatment media*", Surf. and Coat. Technol., 422 (2021) 127505

[21] C.V. Funch, A. Palmas, K. Somlo, E.H. Valente, X. Cheng, K. Poulios, **M. Villa**, M.A.J. Somers, T. Christiansen, "*Targeted heat treatment of additively manufactured Ti-6Al-4V for controlled formation of Bi-lamellar microstructures*", J. Mater. Sci. Technol. 10 (2021) 67-76

[22] S. Haratian, F. Niessen, F.B. Grumsen, M.J.B. Nancarrow, E. Pereloma, **M. Villa**, T.L. Christiansen, M.A.J. Somers, "*Strain, Stress and Stress Relaxation in Oxidized Zrcual-Based Bulk Metallic Glass*", Acta Mater. 200 (2020) 674-685

[23] **M. Villa**, M.A.J. Somers, "*On the role of isothermal martensite formation during cryogenic treatment of steels*", J. Heat Treat. Mater., 75:5 (2020) 263-286

[24] T.L. Christiansen, **M. Villa**, C. Tibollo, K.V. Dahl, M.A.J. Somers, "*High temperature solution nitriding of stainless steels; current status and future trends*", J. Heat Treat. Mater. 75:2 (2020) 69-82

[25] **M. Villa**, M.A.J. Somers, "*Cryogenic treatment of an AISI D2 steel: The role of isothermal martensite formation and "martensite conditioning*", Cryogenics, 110 (2020) 103131

[26] Y. Meng, **M. Villa**, T.L. Christiansen, M.A.J. Somers, "*Synchrotron X-Ray investigation of the effect of cryogenic treatment on the microstructure of Ti-6Al-4V*", Applied Surf. Sci., 502.9 (2020) 144087

[27] M. Moghadam, **M. Villa**, P. Moreau, A. Dubois, L. Dubar, C. V. Nielsen, N. Bay, *Analysis of lubricant performance in punching and blanking*, Trib. Int. 141 (2020), 105949

[28] S. Haratian, F.B. Grumsen, **M. Villa**, T.L. Christiansen, M.A.J. Somers, "*Self-repair by stress-induced diffusion of noble elements during oxidation of Zr48Cu36Al8Ag8 bulk metallic glass*", Scr. Mater. 164 (2019) 126-129

[29] S. Haratian, F.B. Grumsen, **M. Villa**, T.L. Christiansen, M.A.J. Somers, "*Surface hardening by gaseous oxidizing of $(Zr_{55}Cu_{30}Al_{10}Ni_5)_{98}Er_2$ bulk-metallic glass*", J. All. Com. 800 (2019) 456-461

[30] F. Niessen, **M. Villa**, M.A.J. Somers, *"Martensite formation from reverted austenite at sub-zero Celsius temperature"*, Metall. Mater. Trans. 49A.11 (2018) 5241–5245

[31] F. Niessen, **M. Villa**, F. Danoix, J. Hald, M.A.J. Somers, *"In-situ analysis of redistribution of carbon and nitrogen during tempering of low interstitial martensitic stainless steel"*, Scr. Mater. 154 (2018) 216–219

[32] **M. Villa**, F. Niessen, M.A.J. Somers, *"In Situ Investigation of the Evolution of Lattice Strain and Stresses in Austenite and Martensite During Quenching and Tempering of Steel"*, Metall. Mater. Trans. 49A (2018) 28–40

[33] **M. Villa**, M.A.J. Somers, *"Thermally Activated Martensite Formation in Ferrous Alloys"*, Scr. Mater. 142 (2017) 46–49

[34] **M. Villa**, M.F. Hansen, M.A.J. Somers, *"Martensite Formation in Fe-C Alloys at Cryogenic Temperatures"*, Scr. Mater. 141 (2017) 129–132

[35] F. Niessen, **M. Villa**, J. Hald, M.A.J. Somers, *"Kinetics Analysis of Two-Stage Austenitization in Supermartensitic Stainless Steel"*, Mater. & Design 116 (2017) 8–15

[36] S.C. Okoro, F. Niessen, **M. Villa**, D. Apel, M. Montgomery, F. Jappe Frandsen, K. Pantleon, *"Complementary Methods for the Characterization of Corrosion Products on a Plant-Exposed Superheater Tube"*, Metallog. Microstr. and Analysis 6:1 (2017) 22–35

[37] F. Niessen, **M. Villa**, D. Apel, O. Kessler, M. Reich, J. Hald, M AJ Somers, *"In Situ Techniques for the Investigation of the Kinetics of Austenitization of Supermartensitic Stainless Steel"*, Mater. Sci. Forum 879 (2016) 1381–1386

[38] **M. Villa**, T.L. Christiansen, M.F. Hansen, M.A.J. Somers, "*Investigation of Martensite Formation in Fe Based Alloys During Heating From Boiling Nitrogen Temperature"*, Metall. Ital. 11:12 (2015) 39–46

[39] **M. Villa**, M.F. Hansen, K. Pantleon, M.A.J. Somers, *"Anomalous kinetics of lath martensite formation in stainless steel"*, Mater. Sci. Technol. 31:11 (2015) 1355-1361

[40] **M. Villa**, M.F. Hansen, K. Pantleon, M.A.J. Somers, *"Thermally activated growth of lath martensite in Fe–Cr–Ni–Al stainless steel"*, Mater. Sci. Technol. 31:1 (2015) 115-122

[41] **M. Villa**, K. Pantleon, M.A.J. Somers, *"Evolution of compressive strains in retained austenite during sub-zero Celsius martensite formation and tempering"*, Acta Mater. 65 (2014) 383–392

[42] **M. Villa**, K. Pantleon, M. Reich, O. Kessler, M.A.J. Somers, *"Kinetics of anomalous multi-step formation of lath martensite in steel"*, Acta Mater. 80 (2014) 468–477

[43] **M. Villa**, K. Pantleon, M.A.J. Somers, *"In situ investigation of the martensitic transformation in Fe–12 wt.%Ni–0.6 wt.%C steel at subzero temperatures"*, J. All. Com. S1:577 (2013) S543-S548

[44] **M. Villa**, F.B. Grumsen, K. Pantleon, M.A.J. Somers, *"Martensitic transformation and stress partitioning in a high-carbon steel"*, Scr. Mater. 67:6 (2012) 621–624

Pubblicazioni perr-reviewed in proceedings di conferenze internazionali:

[1] G. Macoretta, C.M. Belardini, B.D. Monelli, R. Valentini, M.E. Palmieri, **M. Villa**, L. Tricarico, S. Bruschi, M.M. Tedesco, "*Effects of hydrogen on the mechanical properties of QP1180 AHSS*", Proc. Structural Integrity 79 (2026) 508-516

[2] E.M. Palmieri, **M. Villa**, M. Abruzzo, G. Macoretta, S. Bruschi, L. Tricarico, "*Experimental characterization of QP1180 steel and its performance in stamping simulation: Comparison with DP1180*", Italian Manufacturing Association Conference: XVII AITeM, 2025, Bari, IT

[3] A. Ayiotis, L. Emanuelli, M. Bourrigault, Z. Pan, K. Gama Sales de Souza, W. Tsitsishvili, M. Pellizzari, V.K. Nadimpalli, T.L. Christiansen, M.A.J. Somers, **M. Villa**, "*Additive Manufacturing of carbide reinforced β titanium alloys for biomedical applications via in situ alloying*", Proc. of the 4th Mediterranean Conference HTSE, 2024, Lecce, IT

[4] E.M.Palmieri, **M. Villa**, L. Tricarico, *Study of the effects of rapid tempering on 0.4 wt%C, Boron containing martensitic press hardened steel*", Proc. of the 4th Mediterranean Conference HTSE, 2024, Lecce, IT

[5] **M. Villa**, B. Ali, M.A.J. Somers, "*Thermally activated martensite formation: an essential revision of the physical metallurgy of steel*", proceeding of the Heat treating conference 84901 (2024) 227–233

[6] F. Niessen, **M. Villa**, M.A.J. Somers, "Residual stress measurements across the scales", proceeding of the Heat treating conference 84901 (2024) 234–238

[7] T.L. Christiansen, A.F.K. Körkel, C.V. Funch, E.H. Valente, **M. Villa**, M.S. Jellesen, M.A.J. Somers, "*Advances in Thermochemical Surface Engineering and Heat Treatment of Titanium and Titanium Alloys*", Proc. of the 27th IFHTSE Congress, 2022, Salzburg, AT

[8] T.L. Christiansen, **M. Villa**, C. Tibollo, K.V. Dahl, M.A.J. Somers, "*New developments in high temperature solution nitriding of stainless steels*", Proc. ESSC & duplex 2019, 2019 Wien, AT

[9] C. Tibollo, **M. Villa**, T.L. Christiansen, M.A.J. Somers, "*High and low temperature surface hardening of martensitic stainless steels*", Proc. ESSC & duplex 2019, 2019 Wien, AT

[10] M. Pellizzari, V. Menegate, **M. Villa**, M. A.J. Somers, "*On the influence of deep cryogenic treatment on tempering transformations in AISI D2 steels*, Proc. of the 26th IFHTSE Congress, 2019, Moscow, RU

[11] T.L. Christiansen, **M. Villa**, C. Tibollo, K.V. Dahl, M.A.J. Somers, "*High temperature solution nitriding of stainless steels; current status and future trends*", Proc. ECHT 2019, 2019, Bardolino, IT

[12] **M. Villa**, M.A.J. Somers, *"Activation energy of time-dependent martensite formation in steel"*, In: A. Stebner, G.B. Olson (eds) Proc. ICOMAT 2017, Chicago, IL, USA. The Minerals, Metals & Materials Series. Springer, Cam (2018) 13–19

[13] **M. Villa**, K.V. Dahl, T. L. Christiansen, *"High temperature gas nitriding of Cr containing martensitic steels"*, Proc. of the 7th Int. Congress on Science and Technol. of Steelmaking (ICS 2018), 2018, Venice, IT

[14] C. Tibollo, **M. Villa**, T.L. Christiansen, M.A.J. Somers, *"Gaseous surface hardening of martensitic stainless steels"*, Proc. of the 2018 European Conference on Heat Treatment, 2018, Friedrichshafen, DE

[15] **M. Villa**, M.A.J. Somers, *"Cryogenic Treatment of Steel: from Concept to Metallurgical Understanding"*, Proc. of the 24th IFHTSE Congress, 2017, Nice, FR

[16] **M. Villa**, *"Nuovi orizzonti sulle trasformazioni di fase a bassa temperatura negli acciai"*, Proc. of conference on "Tecniche innovative di indurimento superficiale e trattamento criogenico degli acciai", 2016, Trento, IT

[17] **M. Villa**, T.L. Christiansen, M.F. Hansen, M.A.J. Somers, "*Sub-zero Celsius treatment: a promising option for future martensitic stainless steels*", Proc. of the 23th IFHTSE Congress, 2016, Savannah, USA, pp 317–325

[18] **M. Villa**, T.L. Christiansen, M.F. Hansen, M.A.J. Somers, *"Martensitbildung in Fe-basierten Legierungen während der Erwärmung von Stickstoff-Siedetemperatur",* J. Heat Treat. Mater. 71 (2016) 1–8

[19] **M. Villa**, M.F. Hansen, M.A.J. Somers., "*The Sub-Zero Celsius Treatment of Precipitation Hardenable Semi-Austenitic Stainless Steel"*, Proc. of the 28th ASM Heat Treating Society Conference, 2015, Detroit, USA, pp 431–435

[20] **M. Villa**, T.L. Christiansen, M.F. Hansen, M.A.J. Somers, "*Investigation of Martensite Formation in Fe Based Alloys During Heating From Boiling Nitrogen Temperature"*, Proc. of the European Conference on Heat Treatment & 22nd IFHTSE congress, 2015, Venice, IT

[21] **M. Villa**, M.F. Hansen, K. Pantleon, M.A.J. Somers*, "In-situ investigation of martensite formation in AISI 52100 bearing steel at sub-zero Celsius temperature"*, Proc. of the 2nd Mediterranean Conference HTSE, 2013, Dubrovnik, HR

[22] **M. Villa**, K. Pantleon, M.A.J. Somers, "*Enhanced carbide precipitation during tempering of sub-zero Celsius treated AISI 52100 bearing steel"*, Proc. HTSE Conference & Expo 2013, 2013, Chennai, IN

[23] **M. Villa**, K. Pantleon, M.A.J. Somers, *"Sub-zero austenite to martensite transformation in a Fe-Ni-0.6wt.%C alloy"*, Proc. of the 19th IFHTSE Congress, 2011, Glasgow, GB

Brevetti e richieste di brevetto:

[1] T. Dahmen, T.L. Christiansen, **M. Villa**, V.K. Nadimpalli, M.A.J. Somers, "*Production of high-carbon tool steel components by powder-based additive manufacturing and thermal treatment*", patent application WO2025/196334-A1, 25/09/2025

[1] **M. Villa**, K.V. Dahl, T.L. Christiansen, M.A.J. Somers, "*Process for obtaining a fine-grained martensitic structure component*", patent application WO2023/281022 A1, 12/01/2023

Libri e capitolo di libri:

[1] Marcel A.J. Somers, **M. Villa**, T.L. Christiansen, "*High Temperature Solution Nitriding of Stainless steels*", in "Thermochemical Surface Engineering of Steels" ed. E.J. Mittemeijer and M.A.J. Somers, 2ª edizione, 2026, 707-735, Woodhead Publishing

Relazioni e alter attività a conferenze e a giornate di studio:

[1] **4th Mediterranean Conference on Heat Treatment and Surface Engineering 2024**, Lecce, IT, 17/04/2024 - 19/04/2024. Chair: session on "*Heat treatment of Iron and Steel I*"; two talks: "*Thermally activated martensite formation: an essential revision of the physical metallurgy of steel*" and "*Investigation of martensitic transformations in Ti-Nb-Zr alloys*"

[2] **Heat Treat 2023**, Detroit, US, 10/17/2023 – 10/19/2023. Two talks: "*High temperature solution nitriding and heat treatment of martensitic stainless steels for bearing applications" and "Investigation of martensitic transformations in Ti-Nb-Zr-O alloys: experiments and alloy design*".

[3] **European conference on Heat Treatment 2023**, Genova, IT, 05/29/2023 - 05/31/2023. Talk: "*Investigation of martensitic transformations in Ti-Nb-Zr-O alloys: experiments and alloy design*"

[4] **27th IFHTSE Congress**, Salzburg, AT, 09/05/2022 - 09/08/2022. Two talks: "*Austenite aging of 17-4 PH martensitic stainless steel: phenomena, effects and implications*" and "*High temperature solution nitriding and heat treatment of martensitic stainless steels for bearing applications*"

[5] **26th IFHTSE Congress**, Mosca, RU, 09/17/2019 - 09/19/2019. Talk: "*Martensite formation in AISI D2 steel at cryogenic temperatures and associated phenomena*"

[6] **"Heat Treatment & Surface Engineering for Automotive"**, Bardolino, IT, 06/05/2019 - 06/07/2019. Talk: "*Time-dependent transformation of retained austenite at sub-zero Celsius temperatures; from metallurgical understanding to application in practice*"

[7] **25th IFHTSE Congress 2018**, Xi´an, CN, 09/11/2018 - 09/14/2018. **INVITED** talk: "*Effect of cryogenic treatment on microstructure and properties of D2 tool steel*"

[8] **15th International Conference on Martensitic Transformations**, ICOMAT-2017, Chicago, US, 07/09/2017 - 07/14/2017. Talk: "*Time-dependent martensite formation in steel*".

[9] Educational event of the Italian Metallurgical Association "*Tecniche innovative di indurimento superficiale e trattamento criogenico degli acciai*", on 11/10/2016, Trento, IT. **INVITED** talk: "Nuovi orizzonti sulle trasformazioni di fase a bassa temperatura negli acciai"

[10] **24th IFHTSE Congress and European Conference on Heat Treatment 2017**, Nice, FR, 06/26/2017 - 06/29/2017. **INVITED** talk: "*Cryogenic treatment of steel: from concept to metallurgical understanding*"

[11] **23rd IFHTSE Congress 2016**, Savannah, US, 04/18/2016 - 04/21/2016. Talk: "*The Sub-Zero Celsius Treatment of Stainless Steels: Experiments and Perspective*"

[12] **22nd IFHTSE Congress and European Conference on Heat Treatment 2015**, Venice, IT, 05/20/2015 - 05/22/2015: Talk: "*Investigation of martensite formation in Fe based alloys during heating from boiling nitrogen temperature*"

[13] **14th International Conference on Martensitic Transformations**, ICOMAT-2014, Bilbao, ES, 07/06/2014 - 07/11/2014. Talk: "*Anomalous kinetics of lath martensite formation in stainless steel*".

[14] **2nd Mediterranean Conference on Heat Treatment and Surface Engineering 2013**, Dubrovnik-Cavtat, HR, 06/11/2013 - 06/14/2013. Talk: "*In-situ investigation of martensitic transformation in AISI 52100 steel at sub-zero Celsius temperature*"

[15] **19th IFHTSE Congress**, Glasgow, GB, 10/17/2011 - 10/20/2011. Talk: "*Martensitic transformation in a Fe-Ni-0.8wt%C alloy at sub-zero Celsius temperatures*"

[16] **13th International Conference on Martensitic Transformations**, ICOMAT-2011, Osaka, Japan, 09/04/2011 - 09/09/2011. Talk: "*In-situ investigation of martensitic transformation in Fe-Ni-0.8wt%C at sub-zero temperature*"

Lista completa delle attività di insegnamento

Anno	Ruolo	Tipo di corso	Titolo del corso
2026	Responsabile	Course (MSc)	Green and Sustainable Metallurgy
2026	Responsabile	Course (BSc)	Metallurgia
2026	Supervisore	BSc	Caratterizzazione al microscopio elettronico a scansione di magneti permanenti legati con matrice polimerica ottenuti da polveri magnetiche riciclate
2026	Supervisore	Internship (BSc)	Caratterizzazione metallografica e SEM/EDS di campioni metallici sottoposti a trattamenti termici e di superficie
2026	Responsabile	Course (BSc)	Laboratorio di Metallurgia
2025	Responsabile	Course (MSc)	Green and Sustainable Metallurgy
2025	Responsabile	Course (BSc)	Metallurgia
2025	Supervisore	BSc	Studio degli effetti di cicli termici di saldatura a resistenza sulla microstruttura di acciai alto-resistenziali avanzati
2025	Supervisore	Internship (BSc)	Applicazione di modelli numerici multifisici alla simulazione fisica
2024	Responsabile	Course (MSc)	Green and Sustainable Metallurgy
2024	Responsabile	Course (BSc)	Metallurgia
2024	Supervisore	BSc	Ammonia corrosion of heat resistant alloys
2024	Supervisore	BSc	Characterization of Ti-Nb-Zr alloys for biomedical applications
2024	Supervisore	BSc	Intercritical annealing and characterization of Ti-Nb-Zr alloys for biomedical applications
2024	Supervisore	BSc	Heat treatment and characterization of austenitic stainless steel springs
2024	Responsabile	Course (BSc)	Design-build 3: solar cooker
2024	Docente	Course (BSc)	Materials characterization and testing
2024	Responsabile	Course (BSc)	Materials technology
2024	Responsabile, Supervisore	Tirocinio	Tribocorrosion of surface treated Titanium samples
2024	Supervisore	MSc	Computational design of advanced Titanium alloys using physics-informed machine learning
2024	Supervisore	MSc	Identification of degradation mechanisms during ammonia corrosion of heat resistant alloys
2024	Supervisore	MSc	Optimization of microstructure and properties of duplex steel powders manufactured by binder jetting
2024	Supervisore	PhD	In-situ martensite formation
2024	Esaminatore	PhD	Powder metal extrusion of TWIP steel components
2024	Supervisore	PhD	Martensitic transformations in Ti-Nb-Zr alloys
2024	Supervisore	Corso indiv. - PhD course	Thermochemical Processing of Metals

2024	Supervisore	Corso indiv.	Binder-jetting of recycled tool steel powder
2024	Supervisore	Corso indiv.	Mechanical testing of novel in-situ alloyed titanium alloys manufactured with laser-powder bed fusion
2024	Supervisore	Corso indiv.	Reaction of heat resistant alloys with carbon-containing gasses
2024	Supervisore	Corso indiv.	Surface engineering of stainless steels with carburizing
2024	Supervisore	Corso indiv.	The role of deformation in low temperature surface hardening of stainless steel
2024	Supervisore	Corso indiv. - PhD course	Materials science talks
2023	Supervisore	BSc	Additive manufacturing of titanium alloys
2023	Supervisore	BSc	Effect of atmosphere during additive manufacturing on the microstructure of Ti64
2023	Supervisore	BSc	Synthesis and characterization of interstitially loaded biomedical titanium martensite
2023	Responsabile	Course (BSc)	Design-build 3: solar cooker
2023	Docente	Course (BSc)	Laboratory course in metallurgy
2023	Responsabile	Course (BSc)	Materials technology
2023	Assistente	Course (MSc)	Project course in materials engineering
2023	Responsabile, Supervisore	Tirocinio	Titanium alloys by additive manufacturing: characterization and post-processing
2023	Supervisore	MSc	Precipitates in nitrided martensitic stainless steels
2023	Supervisore	PhD	Investigation of deformation mechanisms in strong and ductile alloys
2023	Supervisore	Corso indiv.	3D print of titanium alloys
2023	Supervisore	Corso indiv.	Microstructure characterization of martensite formation in PH steel with different nitrogen contents
2023	Supervisore	Corso indiv.	Solving corrosion problems in ECG studs by innovative gaseous surface treatments
2022	Supervisore	BSc	Surface engineering and heat treatment of martensitic stainless steels for wind turbine applications
2022	Docente	Course (BSc)	Materials characterization and testing
2022	Responsabile, Supervisore	Tirocinio	Investigation of the evolution of the microstructure during the thermal treatment of novel biocompatible titanium alloys
2022	Esaminatore	PhD	Surface engineering of titanium for dental applications
2022	Supervisore	Corso indiv.	High interstitial stainless steel alloys; synthesis and characterization
2022	Supervisore	Corso indiv.	New paths to nitrogen containing tool steels for improved performance
2021	Responsabile	Course (BSc)	Design-build 3: solar cooker
2021	Responsabile	Course (BSc)	Design-build 3: solar cooker
2021	Assistente	Corso (BSc)	Laboratory course in metallurgy
2021	Supervisore	MSc	Design of TWIP-TRIP steels by solution nitriding of duplex stainless steel
2021	Supervisore	MSc – non completato	Oxidation behavior of bulk metallic glass
2021	Esaminatore	PhD	Microstructure optimization of AM metals through heat treatment and interstitials alloying
2021	Supervisore	PhD	Thermochemical treatment of titanium and titanium alloys
2021	Supervisore	Corso indiv.	Thermochemical surface engineering of 100Cr6 bearing steel
2020	Responsabile	Corso (BSc)	Design-build 3: solar cooker
2020	Supervisore	PhD	Surface engineering of bulk metallic glasses
2019	Supervisore	BSc	Cryogenic treatment of stainless steel
2019	Responsabile	Corso (BSc)	Design-build 3: solar cooker
2019	Assistente	Corso (BSc)	Materials characterization and testing
2019	Assistente	Corso (MSc)	Project course in materials engineering
2019	Supervisore	MSc	Characterization of martensitic stainless steels for wind turbine applications
2019	Supervisore	MSc	Influence of microstructure on thermochemical surface treatment of titanium alloys

2019	Supervisore	Corso indiv.	Application of characterization techniques for microstructure analysis Investigate martensite formation in interstitial alloys
2019	Supervisore	Corso indiv.	Deformation mechanisms in metallic materials
2019	Supervisore	Corso indiv.	Electron microscopy characterization of nitrided martensitic stainless steel
2019	Supervisore	Corso indiv.	Grain refinement of austenitic stainless steel by the use of gas processes
2018	Supervisore	BSc	Cryogenic treatment of high temperature solution nitrided martensitic stainless steel for new bearing applications
2018	Assistente	Corso (MSc)	Project course in materials engineering
2018	Supervisore	Tirocinio	Microstructure characterisation of thermochemically surface treated titanium
2018	Responsabile, Supervisore	Tirocinio	Solution nitriding of Cr containing martensitic steels
2018	Supervisore	MSc	Surface hardening of ductile cast iron
2018	Supervisore	MSc	Tool life and lubrication in blanking operations
2018	Supervisore	Corso indiv.	Characterization of a V-containing martensitic stainless steel subjected to high temperature solution nitriding and tempering
2018	Supervisore	Corso indiv.	Electron microscopy of copper precipitates in iron-based alloys
2017	Assistente	Corso (MSc)	Project course in materials engineering
2017	Supervisore	MSc	Cryogenic treatment of Titanium Alloys
2017	Supervisore	MSc	Cryotreatment of Tool steels
2017	Supervisore	MSc	Effect of cryogenic treatment on tempering behaviour
2017	Supervisore	Corso indiv.	Bainite formation
2017	Supervisore	Corso indiv.	Characterization of martensite in cryo-treated stainless steel
2017	Supervisore	Corso indiv.	Copper precipitation in stainless steel
2016	Assistente	Corso	Project Corso in materials engineering
2016	Supervisore	Corso indiv.	Application of cryo-treatment for a new generation of martensitic stainless steel
2015	Assistente	Corso	Physical metallurgy
2015	Assistente	Corso (MSc)	Project course in materials engineering
2015	Supervisore	Corso indiv.	Formation of martensite by sub-zero treatment in martensitic stainless steel alloys
2015	Supervisore	Corso indiv.	Martensitic transformations in Fe-Cr-Ni-Al alloys
2013	Supervisore	Corso indiv.	Metallurgical investigation of low temperature nitrided 17-7 PH stainless steel
2013	Supervisore	Corso indiv.	The effect of cryogenic treatments on the tempering behaviour of steel
2012	Assistente	Corso (BSc)	Laboratory course in metallurgy
2011	Assistente	Corso (BSc)	Laboratory course in metallurgy