

# **ΒΙΟΓΡΑΦΙΚΟ ΣΗΜΕΙΩΜΑ**

**ΙΑΚΩΒΟΥ Γ. ΦΑΝΤΙΔΗ**

**ΔΙΔΑΚΤΟΡΑ ΗΛΕΚΤΡΟΛΟΓΟΥ ΜΗΧΑΝΙΚΟΥ  
& ΜΗΧΑΝΙΚΟΥ ΥΠΟΛΟΓΙΣΤΩΝ ΔΗΜΟΚΡΙΤΕΙΟΥ  
ΠΑΝΕΠΙΣΤΗΜΙΟΥ ΘΡΑΚΗΣ**

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## ΠΡΟΣΩΠΙΚΑ ΣΤΟΙΧΕΙΑ

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Όνομα Πατρός: Γεώργιος

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Στρατιωτική θητεία: Εκπληρωμένη ως διαχειριστής του δικτύου υπολογιστών του Δ΄ Σώματος Στρατού

## ΕΚΠΑΙΔΕΥΣΗ - ΣΠΟΥΔΕΣ

- Μάρτιος 2015: Θερμογράφος επιπέδου I.
- Δεκέμβριος 2005 – Μάρτιος 2010: Διδακτορικό δίπλωμα στον Τομέα Ειδίκευσης: "Τεχνολογίες Συστημάτων Ενέργειας & Εκμετάλλευσης Ανανεώσιμων Ενεργειακών Πηγών" του Τμήματος Ηλεκτρολόγων Μηχανικών και Μηχανικών Υπολογιστών του Δημοκρίτειου Πανεπιστημίου Θράκης.
- Οκτώβριος 2003 – Ιούνιος 2005: Μεταπτυχιακό δίπλωμα στον Τομέα Ειδίκευσης: "Τεχνολογίες Συστημάτων Ενέργειας & Εκμετάλλευσης Ανανεώσιμων Ενεργειακών Πηγών" του Τμήματος Ηλεκτρολόγων Μηχανικών και Μηχανικών Υπολογιστών του Δημοκρίτειου Πανεπιστημίου Θράκης με γενικό βαθμό 9,30.
- Οκτώβριος 1998 – Ιούλιος 2003: Δίπλωμα τμήματος Ηλεκτρολόγων Μηχανικών και Μηχανικών Υπολογιστών του Δ.Π.Θ. με γενικό βαθμό 8,29.
- 1985-1997: Στοιχειώδης και Μέση στην Αριδαία.

## ΥΠΟΤΡΟΦΙΕΣ - ΒΡΑΒΕΙΑ

- Δεκέμβριος 2010: Από το διοικητή του 1<sup>ου</sup> Συγκροτήματος Επικοινωνιών Ηλεκτρονικού Πολέμου Πληροφορικής–Επιτηρήσης για τη βελτίωση της λειτουργίας των μηχανογραφικών εφαρμογών και του εσωτερικού δικτύου λειτουργίας (LAN) του Δ΄ Σώματος Στρατού.
- Σεπτέμβριος 2006: Από το ίδρυμα Μποδοσάκη για την επίδοση στις μεταπτυχιακές σπουδές ως υποψήφιος διδάκτορας στο Τμήμα Ηλεκτρολόγων Μηχανικών και Μηχανικών Υπολογιστών.
- Μάιος 2006: Από το πρόγραμμα «Τεχνογένεσις» στα πλαίσια διαγωνισμού επιχειρηματικού σχεδίου μεταπτυχιακών και προπτυχιακών φοιτητών Αν. Μακεδονίας και Θράκης.
- Δεκέμβριος 2004: Από το Τεχνικό Επιμελητήριο Ελλάδας για την επίδοση στις σπουδές στο Τμήμα Ηλεκτρολόγων Μηχανικών και Μηχανικών Υπολογιστών.

- Σεπτέμβριος 2004: Σαν μεταπτυχιακός φοιτητής από το πρόγραμμα ΠΕΣΠ του Δημοκρίτειου Πανεπιστημίου Θράκης για την επίδοση στις σπουδές στο Τμήμα Ηλεκτρολόγων Μηχανικών και Μηχανικών Υπολογιστών.
- Ιούνιος 2003: Από το Ίδρυμα Κρατικών Υποτροφιών για την επίδοση στις σπουδές στο Τμήμα Ηλεκτρολόγων Μηχανικών και Μηχανικών Υπολογιστών.
- Φεβρουάριος 1998: Από το Ίδρυμα Κρατικών Υποτροφιών.

#### ΕΠΑΓΓΕΛΜΑΤΙΚΗ ΕΜΠΕΙΡΙΑ

- Δεκέμβριος 2017 – σήμερα: Επίκουρος Καθηγητής, Τμήμα Ηλεκτρολόγων Μηχανικών, ΤΕΙ Ανατολικής Μακεδονίας και Θράκης.
- Δεκέμβριος 2015 – Νοέμβριος 2017: Ηλεκτρολόγος Μηχανικός στον ΔΕΔΔΗΕ, Διεύθυνση Περιφέρειας Κεντρικής Ελλάδος/Τομέας Ανάπτυξης και Λειτουργίας Δικτύου.
- Μάιος 2010 – Απρίλιος 2011 & Μάρτιος 2012 – Δεκέμβριος 2014: Ελεύθερος Επαγγελματίας ως Ηλεκτρολόγος Μηχανικός & Μηχανικός Υπολογιστών.
- Οκτώβριος 2014 – Νοέμβριος 2014: Επιστημονικός Συνεργάτης στο Ερευνητικό Έργο "SAFE Η POWER", Επιστημονικός Υπεύθυνος Αν. Καθηγητής Γιάκας Γιάννης, Εθνικό Κέντρο Έρευνας & Τεχνολογικής Ανάπτυξης.
- Μάρτιος 2012 – Αύγουστος 2012: Επιστημονικός Συνεργάτης στο Ερευνητικό Έργο "NANOCAPILLARY<sup>®</sup>", Επιστημονικός Υπεύθυνος Καθηγητής Α. Μητρόπουλος, ΑΤΕΙ Καβάλας.
- Ιούνιος 2010 – Φεβρουάριος 2011: Διαχειριστής του δικτύου υπολογιστών του Δ' Σώματος Στρατού κατά τη διάρκεια της στρατιωτικής του θητείας.
- Νοέμβριος 2009 – Φεβρουάριος 2010: Επιστημονικός Συνεργάτης στο Ερευνητικό Έργο "Η συμβολή των πυρηνικών αποβλήτων στην παραγωγή ενέργειας από πυρηνικούς σταθμούς", Επιστημονικός Υπεύθυνος Αν. Καθηγητής Γ. Νικολάου, Δημοκρίτειο Πανεπιστήμιο Θράκης.
- Φεβρουάριος 2009 – Μάιος 2009: Επιστημονικός Συνεργάτης στο Ερευνητικό Έργο "Μέτρηση φυσικής και τεχνητής ραδιενέργειας στο περιβάλλον", Επιστημονικός Υπεύθυνος Αν. Καθηγητής Γ. Νικολάου, Δημοκρίτειο Πανεπιστήμιο Θράκης.
- Σεπτέμβριος 2008 – Νοέμβριος 2008: Επιστημονικός Συνεργάτης στο Ερευνητικό Έργο, "Προσδιορισμός προέλευσης πυρηνικών υλικών από πυρηνικούς αντιδραστήρες ισχύος με χρήση ισοτοπικής ανάλυσης", Επιστημονικός Υπεύθυνος Αν. Καθηγητής Γ. Νικολάου, Δημοκρίτειο Πανεπιστήμιο Θράκης.
- Μάρτιος 2008 – Ιούνιος 2008: Επιστημονικός Συνεργάτης στο Ερευνητικό Έργο "Ενίσχυση Σπουδών Πληροφορικής στο Δημοκρίτειο Πανεπιστήμιο Θράκης", Επιστημονικός Υπεύθυνος Καθηγητής Δ. Παπαδόπουλος, Δημοκρίτειο Πανεπιστήμιο Θράκης.

- Μάρτιος 2008: Επιστημονικός Συνεργάτης στο Ερευνητικό Έργο "Μέτρηση φυσικής και τεχνητής ραδιενέργειας στο περιβάλλον", Επιστημονικός Υπεύθυνος Αν. Καθηγητής Γ. Νικολάου, Δημοκρίτειο Πανεπιστήμιο Θράκης.
- Δεκέμβριος 2007 – Φεβρουάριος 2008: Επιστημονικός Συνεργάτης στο Ερευνητικό Έργο "Ενίσχυση Σπουδών Πληροφορικής στο Δημοκρίτειο Πανεπιστήμιο Θράκης", Επιστημονικός Υπεύθυνος Καθηγητής Δ. Παπαδόπουλος, Δημοκρίτειο Πανεπιστήμιο Θράκης.
- Μάρτιος 2007 – Απρίλιος 2008: Εξωτερικός συνεργάτης της ECDL Ελλάς.
- Μάρτιος 2006 – Ιούνιος 2006: Επιστημονικός Συνεργάτης στο Ερευνητικό Έργο "Ανίχνευση ραδιοϊσοτόπων σε υγρά και στερεά με τη μέθοδο γ-φασματοσκοπίας", Επιστημονικός Υπεύθυνος Καθηγητής Ν. Τσάγκας, Δημοκρίτειο Πανεπιστήμιο Θράκης.
- Απρίλιος 2005 – Μάιος 2005: Επιστημονικός Συνεργάτης στο Ερευνητικό Έργο "Ανίχνευση ραδιοϊσοτόπων σε υγρά και στερεά με τη μέθοδο γ-φασματοσκοπίας", Επιστημονικός Υπεύθυνος Καθηγητής Ν. Τσάγκας, Δημοκρίτειο Πανεπιστήμιο Θράκης.

#### ΔΙΔΑΚΤΙΚΗ ΕΜΠΕΙΡΙΑ

##### Τριτοβάθμια Εκπαίδευση

Ακαδημαϊκό Έτος	Εξάμηνο	Τμήμα	Μάθημα
2017 – 2018	Εαρινό	Ηλεκτρολόγων Μηχανικών TE, TEI A.M.Θ.	Μοντελοποίηση Συστημάτων (θεωρία), Ηλεκτρικές και Ηλεκτρονικές Τεχνολογίες στην Ιατρική (θεωρία), Ηλεκτρικές Εγκαταστάσεις II (εργαστήριο), Ηλεκτρικές Μηχανές II (εργαστήριο)
2017 – 2018	Χειμερινό	MSc in Innovation in Technology & Engineering Management	Ενεργειακή Απόδοση Κτιρίων και Μη Καταστροφικός Έλεγχος
2017 – 2018	Χειμερινό	Ηλεκτρολόγων Μηχανικών TE, TEI A.M.Θ.	Πυρηνική Τεχνολογία (θεωρία & εργαστήριο)
2015 – 2016	Χειμερινό	Ηλεκτρολόγων Μηχανικών TE, TEI A.M.Θ.	Πυρηνική Τεχνολογία (θεωρία & εργαστήριο), Ηλεκτρικές Εγκαταστάσεις I (θεωρία), Μη Καταστροφικός Έλεγχος (θεωρία)
2014 – 2015	Εαρινό	Ηλεκτρολόγων Μηχανικών TE, TEI A.M.Θ.	Ηλεκτρικές Εγκαταστάσεις II (θεωρία), Μοντελοποίηση Συστημάτων (θεωρία),
2014 – 2015	Χειμερινό	Ηλεκτρολόγων Μηχανικών TE, TEI A.M.Θ.	Πυρηνική Τεχνολογία (θεωρία & εργαστήριο), Ηλεκτρικές Εγκαταστάσεις I (θεωρία), Μη Καταστροφικός Έλεγχος (θεωρία)

2013 – 2014	Εαρινό	Master in Innovation in Technology & Entrepreneurship	Group Project
2012 – 2013	Εαρινό	Master in Innovation in Technology & Entrepreneurship	Group Project
2012 – 2013	Εαρινό	Ηλεκτρολογίας, ΑΤΕΙ Καβάλας	Ηλεκτρικές Εγκαταστάσεις ΙΙ (θεωρία και εργαστήριο), Ηλεκτρικές Μηχανές ΙΙ (θεωρία)
2012 – 2013	Χειμερινό	Ηλεκτρολογίας, ΑΤΕΙ Καβάλας	Μοντελοποίηση Συστημάτων (θεωρία), Ηλεκτρικές Εγκαταστάσεις Ι (θεωρία), Ηλεκτρικές Μηχανές Ι (θεωρία), Συστήματα Ηλεκτρικής Ενέργειας ΙΙ (θεωρία), Νομοθεσία και Ασφάλεια Εργασίας (εργαστήριο)
		Βιομηχανικής Πληροφορικής, ΑΤΕΙ Καβάλας	Βιομηχανικά Συστήματα Ηλεκτρικής Ενέργειας (θεωρία), Ηλεκτρικά Κυκλώματα (εργαστήριο)
2011 – 2012	Εαρινό	Ηλεκτρολογίας, ΑΤΕΙ Καβάλας	Ηλεκτρικές Εγκαταστάσεις ΙΙ (θεωρία), Τεχνολογία Νέων Υλικών (θεωρία και εργαστήριο)
		Βιομηχανικής Πληροφορικής, ΑΤΕΙ Καβάλας	Ηλεκτρονικά Κυκλώματα (εργαστήριο)
		Δόκιμων Αστφυλάκων Κομοτηνής	Πληροφορική
		Δόκιμων Αστφυλάκων Ξάνθης	Πληροφορική
2011 – 2012	Χειμερινό	Ηλεκτρολογίας, ΑΤΕΙ Καβάλας	Μοντελοποίηση Συστημάτων (θεωρία)
		Βιομηχανικής Πληροφορικής, ΑΤΕΙ Καβάλας	Ηλεκτρικά Κυκλώματα (εργαστήριο)
		Δόκιμων Αστφυλάκων Κομοτηνής	Πληροφορική
		Δόκιμων Αστφυλάκων Ξάνθης	Πληροφορική
2010 – 2011	Εαρινό	Ηλεκτρολογίας, ΑΤΕΙ Καβάλας	Ανανεώσιμες Πηγές Ενέργειας Ι (εργαστήριο), Ανανεώσιμες Πηγές Ενέργειας ΙΙ (εργαστήριο), Νομοθεσία και Ασφάλεια Εργασίας (εργαστήριο)
2010 – 2011	Χειμερινό	Ηλεκτρολογίας, ΑΤΕΙ Καβάλας	Ανανεώσιμες Πηγές Ενέργειας Ι (εργαστήριο), Ανανεώσιμες Πηγές Ενέργειας ΙΙ (εργαστήριο), Νομοθεσία και Ασφάλεια Εργασίας (εργαστήριο)
2009 – 2010	Εαρινό	Ηλεκτρολογίας, ΑΤΕΙ	Ανανεώσιμες Πηγές Ενέργειας Ι

		Καβάλας	(εργαστήριο), Ανανεώσιμες Πηγές Ενέργειας II (εργαστήριο), Νομοθεσία και Ασφάλεια Εργασίας (εργαστήριο), Ηλεκτροτεχνία II (εργαστήριο)
2009 – 2010	Χειμερινό	Ηλεκτρολόγων Μηχανικών & Μηχανικών Υπολογιστών, Δημοκρίτειο Πανεπιστήμιο Θράκης	Πυρηνική Τεχνολογία (εργαστήριο), Δοσιμετρία (εργαστήριο)
		Ηλεκτρολογίας, ΑΤΕΙ Καβάλας	Ανανεώσιμες Πηγές Ενέργειας I (εργαστήριο), Ανανεώσιμες Πηγές Ενέργειας II (εργαστήριο), Νομοθεσία και Ασφάλεια Εργασίας (εργαστήριο), Ηλεκτροτεχνία II (εργαστήριο)
2008 – 2009	Εαρινό	Ηλεκτρολόγων Μηχανικών & Μηχανικών Υπολογιστών, Δημοκρίτειο Πανεπιστήμιο Θράκης	Μαθηματική Ανάλυση II
		Βιομηχανικής Πληροφορικής, ΑΤΕΙ Καβάλας	Ηλεκτρικά Κυκλώματα (εργαστήριο)
2008 – 2009	Χειμερινό	Ηλεκτρολόγων Μηχανικών & Μηχανικών Υπολογιστών, Δημοκρίτειο Πανεπιστήμιο Θράκης	Πυρηνική Τεχνολογία (εργαστήριο), Δοσιμετρία (εργαστήριο)
		Βιομηχανικής Πληροφορικής, ΑΤΕΙ Καβάλας	Ηλεκτρικά Κυκλώματα (εργαστήριο)
2007 – 2008	Εαρινό	Ηλεκτρολόγων Μηχανικών & Μηχανικών Υπολογιστών, Δημοκρίτειο Πανεπιστήμιο Θράκης	Εισαγωγή στην Πυρηνική Τεχνολογία (εργαστήριο), Ασφάλεια Πυρηνικής Ενέργειας και Επιπτώσεις στο Περιβάλλον Πυρηνική Τεχνολογία (εργαστήριο), Μαθηματική Ανάλυση II, Λογισμός Μεταβολών
		Βιομηχανικής Πληροφορικής, ΑΤΕΙ Καβάλας	Ηλεκτρικά Κυκλώματα (εργαστήριο)
2007 – 2008	Χειμερινό	Ηλεκτρολόγων Μηχανικών & Μηχανικών Υπολογιστών, Δημοκρίτειο Πανεπιστήμιο Θράκης	Γραμμική Άλγεβρα, Εξισώσεις Διαφορών και Εφαρμογές
		Βιομηχανικής Πληροφορικής, ΑΤΕΙ Καβάλας	Ηλεκτρικά Κυκλώματα (εργαστήριο)
2006 – 2007	Εαρινό	Ηλεκτρολόγων Μηχανικών & Μηχανικών Υπολογιστών, Δημοκρίτειο Πανεπιστήμιο Θράκης	Εισαγωγή στην Πυρηνική Τεχνολογία (εργαστήριο) Δοσιμετρία (εργαστήριο)
		Βιομηχανικής Πληροφορικής, ΑΤΕΙ Καβάλας	Ηλεκτρικά Κυκλώματα (εργαστήριο)

2006 – 2007	Χειμερινό	Ηλεκτρολόγων Μηχανικών & Μηχανικών Υπολογιστών, Δημοκρίτειο Πανεπιστήμιο Θράκης	Πυρηνική Τεχνολογία (εργαστήριο)
		Βιομηχανικής Πληροφορικής, ΑΤΕΙ Καβάλας	Ηλεκτρικά Κυκλώματα (εργαστήριο)

### Ενηλίκων - Δευτεροβάθμια Εκπαίδευση

Ακαδημαϊκό Έτος	Εξάμηνο	Φορέας	Μάθημα
2009 – 2010	Χειμερινό	ΙΕΚ Ξάνθης	Λογιστικά Φύλλα σε Windows
2008 – 2009	Εαρινό	ΙΕΚ Ξάνθης	Λογιστικά Φύλλα
2008 – 2009	Χειμερινό	ΙΕΚ Ξάνθης	Ηλεκτρονική Επεξεργασία Εικόνας (Photoshop)
		Ε.Σα. ΑΜΕΑ	Πληροφορική
2007 – 2008	Εαρινό	ΙΕΚ Ξάνθης	Ασφάλεια Δεδομένων – Επικοινωνιών
2007 – 2008	Χειμερινό	ΙΕΚ Ξάνθης	Διαχείριση Βάσεων Δεδομένων σε Περιβάλλον SQL Server, Σύστημα Εμπορικής Πληροφόρησης
2006 – 2007	Εαρινό	Φροντιστήριο Μέσης Εκπαίδευσης	Πληροφορική
		ΙΕΚ Ξάνθης	Λογιστικά Φύλλα
2006 – 2007	Χειμερινό	Φροντιστήριο Μέσης Εκπαίδευσης	Πληροφορική
2004 – 2005	Χειμερινό	ΙΕΚ Ξάνθης	Αλγοριθμική και Δομές Δεδομένων

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#### ΣΥΜΜΕΤΟΧΗ ΣΕ ΕΠΑΓΓΕΛΜΑΤΙΚΟΥΣ ΚΑΙ ΑΛΛΟΥΣ ΣΥΛΛΟΓΟΥΣ

- Εξωτερικός συνεργάτης της ECDL A.E.
- Μέλος του Τεχνικού Επιμελητηρίου Ελλάδας.
- Μέλος του Πανελληνίου Συλλόγου Διπλωματούχων Μηχανολόγων – Ηλεκτρολόγων.
- Μέλος του Πανελληνίου Συλλόγου Ελλήνων Φυσικών.

#### ΕΝΔΙΑΦΕΡΟΝΤΑ-ΑΛΛΕΣ ΑΣΧΟΛΙΕΣ

- Σχεδίαση και Ανάπτυξη Ιστοσελίδων
- Διδακτική Πληροφορικής
- Συναρμολόγηση, συντήρηση και επισκευή υπολογιστικών συστημάτων
- Ψηφιακή Επεξεργασία Εικόνας
- Δίκτυα Επικοινωνιών – Internet
- Κυνοφιλία

## ΑΝΑΛΥΣΗ ΤΩΝ ΕΡΓΑΣΙΩΝ (ΔΗΜΟΣΙΕΥΣΕΩΝ)

### Ι. ΔΙΠΛΩΜΑΤΙΚΗ ΕΡΓΑΣΙΑ

"Μελέτη της Ευστάθειας και Ταλάντωση Μερικών Μορφών Μη Γραμμικών Εξισώσεων Διαφορών", Τμήμα Ηλεκτρολόγων Μηχανικών & Μηχανικών Υπολογιστών Δημοκρίτειο Πανεπιστήμιο Θράκης, Ιούνιος 2003.

Οι μη γραμμικές εξισώσεις διαφορών εμφανίζονται συχνά στην φύση και μοντελοποιούν ποικίλα φαινόμενα στην οπτική στη βιολογία στα οικονομικά και στη μηχανική. Η μελέτη των εξισώσεων αυτών έδειξε ότι σε πολλές περιπτώσεις οι λύσεις των μη γραμμικών εξισώσεων διαφορών παρουσιάζουν πολύ πολύπλοκη ή χαοτική συμπεριφορά. Οι εξισώσεις αυτές για τη λύση τους απαιτούν κατάλληλα τεχνάσματα τα οποία δεν αποτελούν κανόνες λύσης γενικών μορφών μη γραμμικών εξισώσεων διαφορών αλλά εφευρέθηκαν μόνο για συγκεκριμένες μορφές εξισώσεων διαφορών. Στην εργασία μελετήθηκαν 6 μη γραμμικές εξισώσεις διαφορών που μοντελοποιούν φαινόμενα που απαντώνται στην μηχανική θεωρητικά αλλά και υπολογιστικά με την βοήθεια του προγράμματος Matlab.

### ΙΙ. ΜΕΤΑΠΤΥΧΙΑΚΗ ΔΙΑΤΡΙΒΗ

"Μελέτη και σχεδιασμός κινητής διάταξης για την μέτρηση ραδιενέργειας σε περιβαλλοντικά δείγματα με την χρήση του λογισμικού MCNP (Monte Carlo N-Particle transport)", Τμήμα Ηλεκτρολόγων Μηχανικών & Μηχανικών Υπολογιστών Δημοκρίτειο Πανεπιστήμιο Θράκης, Ιούνιος 2005.

Οι πυρηνικές ακτινοβολίες εμφανίζονται εδώ και πάρα πολλά χρόνια σε πολλές πρακτικές εφαρμογές της καθημερινής ζωής των ανθρώπων και έτσι άθελα ή ηθελημένα όλοι υφίστανται την επίδραση τους. Το κοσμικό διάστημα, το υπέδαφος, οι εκτεταμένες εφαρμογές των ραδιοϊσοτόπων στην ιατρική, τη βιομηχανία και τη γεωργία, οι δοκιμές πυρηνικών όπλων και η πυρηνική βιομηχανία αποτελούν τις πιο σημαντικές πηγές των ακτινοβολιών αυτών. Σκοπός της εργασίας ήταν ο σχεδιασμός και η μελέτη μιας διάταξης η οποία να επιτρέπει την επιτόπου μέτρηση της ραδιενέργειας σε περιβαλλοντικά δείγματα. Για να είναι δυνατή η άμεση μέτρηση της ραδιενέργειας οι διαστάσεις της διάταξης αυτής είναι τέτοιες που να επιτρέπουν τη μεταφερσιμότητά της. Η όλη διάταξη μοντελοποιήθηκε σε ηλεκτρονικό υπολογιστή με τη βοήθεια του κώδικα MCNPX 2.4.0 (Monte Carlo N-Particle Transport Code System for Multiparticle and High Energy Application), ο οποίος κάνει χρήση της μεθόδου Monte Carlo.

### III. ΔΙΔΑΚΤΟΡΙΚΗ ΔΙΑΤΡΙΒΗ

"Βέλτιστος σχεδιασμός κινητής διάταξης μη καταστρεπτικού ελέγχου τριδιάστατων αντικειμένων με χρήση πυρηνικών ακτινοβολιών", Τμήμα Ηλεκτρολόγων Μηχανικών & Μηχανικών Υπολογιστών Δημοκρίτειο Πανεπιστήμιο Θράκης, Μάρτιος 2010.

Σκοπός της παρούσας διατριβής είναι ο βέλτιστος σχεδιασμός μεταφερόμενων διατάξεων με στόχο τη μη καταστρεπτική ποιοτική και ποσοτική ανάλυση τριδιάστατων αντικειμένων. Η επιλογή για τη βελτιστοποίηση μόνο μεταφερόμενων διατάξεων έγινε με γνώμονα τη διεύρυνση των πεδίων εφαρμογών τους εξαιτίας ακριβώς αυτής της δυνατότητάς τους να μπορούν να μετακινηθούν. Συγκεκριμένα, με τη χρήση των λογισμικών MCNPX και MCNP5 μελετήθηκαν και παρουσιάζονται πέντε διατάξεις. Σε όλες τις περιπτώσεις οι προτεινόμενες διατάξεις σχεδιάστηκαν με γνώμονα ο ρυθμός ισοδύναμης δόσης για τον πληθυσμό που θα εργάζεται πλησίον τους να είναι κάτω από τα επιτρεπτά όρια.

Η πρώτη διάταξη κάνει χρήση της ανάλυσης με νετρονική ενεργοποίηση (*Prompt Gamma Neutron Activation Analysis – PGNA*) κάνοντας χρήση του γεγονότος ότι οι ακτινοβολίες ή τα σωματίδια που εκπέμπονται, παρέχουν πληροφορίες που χαρακτηρίζουν τον αρχικό πυρήνα. Ακολουθεί η παρουσίαση τριών μεταφερόμενων συστημάτων για τη ραδιογραφία τριδιάστατων αντικειμένων. Κύριο χαρακτηριστικό και των τριών αυτών διατάξεων είναι ότι όλα τα επιλεγόμενα υλικά τους είναι συμβατά με την οδηγία RoHS της Ευρωπαϊκής Ένωσης. Η δεύτερη προτεινόμενη διάταξη είναι μία διάταξη ραδιογραφίας θερμικών νετρονίων εκπεμπόμενων από πηγή  $^{252}\text{Cf}$ . Η τρίτη βασίζεται στα φωτονετρόνια πηγής SbBe και είναι κατάλληλη για ραδιογραφία με χρήση θερμικών νετρονίων αλλά και ακτίνων  $-\gamma$ . Το τέταρτο σύστημα βασιζόμενο σε μία μεταφερόμενη γεννήτρια νετρονίων είναι κατάλληλο για ραδιογραφία ταχέων αλλά και θερμικών νετρονίων. Το τελευταίο μεταφερόμενο σύστημα προορίζεται για την ανίχνευση παράνομων υλικών και βασίζεται στη διαφορετική απορρόφηση νετρονίων και ακτίνων  $-\gamma$  όταν διέρχονται μέσα από την ύλη.

#### IV. ΔΗΜΟΣΙΕΥΣΕΙΣ ΣΕ ΔΙΕΘΝΗ ΠΕΡΙΟΔΙΚΑ ΜΕ ΚΡΙΤΕΣ

- A1. A Monte Carlo simulation of neutron activation analysis of bulk objects, **J.G. Fantidis**, G. Nicolaou, N. F. Tsagas, Radiation Measurements Volume 44, Issue 3, March 2009, pages 273–277.

A PGNAA facility comprising an isotopic neutron source has been simulated using the Monte Carlo code MCNPX. The facility is envisaged for elemental composition studies of biomedical, environmental and industrial bulk objects. The study carried out, aimed to improve the detection sensitivity of prompt gamma-rays emitted by a bulk object, measured in the presence of higher energy ones. An appropriate collimator, a filter between the neutron source and the object and an optimisation of the positioning of the neutron beam and the detector relative to the object analysed were means to improve the desired sensitivity. The simulation is demonstrated for the in-vivo PGNAA of boron in the human liver.

- A2. A transportable neutron radiography system based on a SbBe neutron source, **J.G. Fantidis**, G.E. Nicolaou, N.F. Tsagas, Nuclear Instruments and Methods in Physics Research Accelerators, Spectrometers, Detectors and Associated Equipment, Volume 606, Issue 3, 21 July 2009, pages 806–810.

A transportable neutron radiography system, incorporating a SbBe neutron source, has been simulated using the MCNPX code. Design provisions have allowed two radiography systems to be utilised using the same SbBe neutron source. In this respect, neutron radiographies can be carried out using the photoneutrons produced when the  $^{124}\text{Sb}$  is surrounded by the Be target. Alternatively,  $\gamma$ -radiography can be utilised with the photons from the  $^{124}\text{Sb}$  with the target removed. Appropriate collimators were simulated for each of the radiography modes. Apart from Be, the materials considered were compatible with the European Union Directive on ‘Restriction of Hazardous Substances’ (RoHS) 2002/95/EC, hence excluding the use of cadmium and lead. Bismuth was chosen as the material for  $\gamma$ -radiation shielding and the proposed system allowed a maximum activity of the  $^{124}\text{Sb}$  up to  $1.85 \times 10^{13}$  Bq. The system simulated allows different object sizes to be studied with a wide range of radiography parameters.

- A3. Optimization study of a transportable neutron radiography unit based on a compact neutron generator, **J. G. Fantidis**, G. E. Nicolaou, N. F. Tsagas, Nuclear Instruments and Methods in Physics Research Accelerators, Spectrometers, Detectors and Associated Equipment, Volume 618, Issues 1-3, 1 June 2010-21 June 2010, Pages 331–335.

A transportable fast and thermal neutron radiography system, incorporating a compact DD neutron generator, has been simulated using the MCNPX code. The materials considered were compatible with the European Union Directive on ‘Restriction of Hazardous Substances’ (RoHS) 2002/95/EC, hence excluding the use of cadmium and lead. Appropriate collimators were simulated for each of the radiography modes. With suitable aperture and collimator designs, it was possible to optimize the parameters for both fast and thermal neutron radiographies, for a wide range of values of the



collimator ratio. The system simulated allows different object sizes to be studied with a wide range of radiography parameters.

A4. A transportable neutron radiography system, **J. G. Fantidis**, G. E. Nicolaou, N. F. Tsagas, Journal of Radioanalytical and Nuclear Chemistry Volume 284, 2010, pages 479–484.

A transportable neutron radiography system, incorporating a 50 mg  $^{252}\text{Cf}$  source, has been simulated using the MCNPX code. The materials considered were compatible with the European Union Directive on ‘Restriction of Hazardous Substances’ (RoHS) 2002/95/EC, hence excluding the use of cadmium and lead. The design was optimized with respect to neutron moderation, shielding and collimation. High density polyethylene was chosen as the material for moderator and also shielding, which was further enhanced with layers of bismuth and borated polyethylene. Variable values for the collimator ratio were calculated. With suitable aperture and collimator design it was possible to optimize the neutron radiography parameters. Beam filters also were treated in order to improve the results. The proposed system has been considered with a wide range of radiography parameters, which are comparable with neutron radiography facilities from low power reactors.

A5. Non destructive testing of medium and high voltage cables with a transportable radiography system, **J. G. Fantidis**, K. Potolias, D. V. Bandekas, Journal of Engineering Science And Technology Review 3 (1), 2010, pages 89–94.

A power cable is the most important part in a power transmission system. The cables must be total quality dedicated and certified for development, manufacturing and installation, however are exposed to a corrosive environment. The purpose of this paper is to show that the fast neutron radiography with a transportable system is a solution to find defects in the cables and reduce the cost of inspection. The design, regarding the materials considered, was compatible with the European Union Directive on “Restriction of Hazardous Substances” (RoHS) 2002/95/EC, hence excluding the use of cadmium and lead. Wide width values for the collimator ratio were calculated. With suitable collimator design it was possibly to optimize the neutron radiography parameters. Finally the shielding design was examined closely. The proposed system has been simulated using the MCNPX code

A6. Wind turbine blade non destructive testing with a transportable radiography system, **J. G. Fantidis**, C. Potolias, D.V. Bandekas, Science and Technology of Nuclear Installations. Volume 2011, Article ID 347320, pages 1–6.

Wind turbines are becoming widely used as they are an environmentally friendly way for energy production without emissions, however are exposed to a corrosive environment. In addition as wind

turbines typically are the tallest structures in the surrounding area of a wind farm, it is expected that they will attract direct lightning strikes several times during their operating life. The purpose of this paper is to show that the radiography with a transportable unit is a solution to find defects in the wind turbine blade and reduce the cost of inspection. A transportable neutron radiography system, incorporating a Sb-Be source, has been simulated using the MCNPX code. The simulated system has a wide range of radiography parameters.

A7. A transportable Fast Neutron and dual Gamma-ray system for the detection of illicit materials, **J. G. Fantidis**, G. E. Nicolaou, Nuclear Instruments and Methods in Physics Research Accelerators, Spectrometers, Detectors and Associated Equipment A 648 (2011) pages 275–284.

A transportable FNDR radiography system has been simulated using the MCNPX Monte Carlo code. The system is envisaged to be applied to the material characterisation of a suspicious bulky object, in view of identifying illegal materials. The system combines a neutron and two gamma-ray sources achieving characterisation of the material of the object through two ratios, namely  $^{137}\text{Cs}/\text{DD}$  and  $^{60}\text{Co}/\text{DD}$ . Hence, the system discriminates materials of similar or even the same of either of the two ratios. The proposed unit complies with radiation protection requirements achieving a safe occupational environment.

A8. Optimization study of a transportable neutron radiography system based on a  $^{252}\text{Cf}$  neutron source, **J. G. Fantidis**, C. Potolias, N. Vordos, D.V. Bandekas, Moldavian Journal of the Physical Sciences Vol. 10, No.1, pages 121–131, 2011.

The purpose of this work is the optimization of a transportable thermal neutron radiography system. Neutrons produced by a 50 mg  $^{252}\text{Cf}$  source. The design was optimized with respect to parameters related with thermal neutron radiography and shielding. With special collimator design it was possible to optimize the neutron radiography parameters while the use of advanced shielding materials reduced the weight and the volume of the unit. The unit was compatible with the European Union Directive on ‘Restriction of Hazardous Substances’ (RoHS) 2002/95/EC, and has been simulated using the MCNPX code.

A9. The comparison of four neutron sources for Prompt Gamma Neutron Activation Analysis (PGNAA) in vivo detections of Boron, **J. G. Fantidis**, G. E. Nicolaou, C. Potolias, N. Vordos, D. V. Bandekas, Journal of Radioanalytical and Nuclear Chemistry Volume 290, Issue 2 (2011), pages 289–295.

A Prompt Gamma Ray Neutron Activation Analysis (PGNAA) system, incorporating an isotopic neutron source has been simulated using the MCNPX Monte Carlo code. In order to improve the signal to noise ratio different collimators and a filter were placed between the neutron source and the object. The effect of the positioning of the neutron beam and the detector relative to the object

has been studied. In this work the optimisation procedure is demonstrated for boron. Monte Carlo calculations were carried out to compare the performance of the proposed PGNA system using four different neutron sources ( $^{241}\text{Am}/\text{Be}$ ,  $^{252}\text{Cf}$ ,  $^{241}\text{Am}/\text{B}$ , and DT neutron generator). Among the different systems the  $^{252}\text{Cf}$  neutron based PGNA system has the best performance.

A10. The effect of the financial crisis on electricity cost for remote consumers: case study Samothrace (Greece), **J. G. Fantidis**, D. V. Bandekas, C. Potolias, N. Vordos, *International Journal of Renewable Energy Research* Vol.1, No.4, pages 281–289, 2011.

The primary objective of this study is to estimate how the new taxes on fossil fuels in Greece, as a result of financial and economic crisis, has affected the electricity cost for a remote consumer. Two different scenarios were simulated, comparing the possible hybrid system configurations. From HOMER software simulation, it has been demonstrated that, for a typical house in Samothrace, a small Greek island situated in the northern Aegean Sea, the hybrid Wind–PV–Battery system is the optimum solution. For a typical country house in Samothrace the use of a LPG generator has financial and environmental benefits compared to a Diesel generator. However the use of environment friendly renewable energy sources is becoming increasingly important.

A11. Financial and economic crisis creates new data on the electricity for remote consumers: Case study Greece, **Jacob G. Fantidis**, Pantelis Antoniadis, Contsantinos Potolias, Dimitrios V. Bandekas, Nicolaos Vordos, *International Journal of Advances in Engineering, Science and Technology* 1 (1) 2011 pages 49–61.

The financial and economic crisis in Greece has brought new taxes on the fossil fuels. During the depression (January 2009 – June 2011) the diesel-oil price was rising more than 65%. The aim of this study is to investigate how this crisis has affected the electricity cost for a remote consumer. The HOMER software was used in order to find the optimum hybrid system for a typical country house in four different Greek Islands. The generality of Greek Islands are suitable for exploitation of wind energy for electricity generation. Due to the dramatically increased prices for diesel-oil over the last two years in Greece, the PV generators offer not only environmental benefits but also provide lower cost of energy and can displace the diesel engine generators.

A12. Financial analysis of solar water heating systems during the depression: Case study of Greece, **J. G. Fantidis**, D. V. Bandekas, C. Potolias, N. Vordos, K. Karakoulidis, *Inzinerine Ekonomika – Engineering Economics*, Vol.23, No.1, pages 33–40, 2012.

The use of solar thermal collectors is an economic alternative for water heating. In Greece more than 4 million  $\text{m}^2$  of collector area has been installed; however, the financial and economic crisis has dealt the solar thermal market a heavy blow. The aim of the paper is twofold: firstly, to present the new legislations and combined efforts taken by the government in order to give the solar thermal market a boost; secondly, to evaluate the effect of these efforts and calculate the new

financial data from the citizens. For the promotion of solar water heaters, new legislations and concerted efforts are taken by the government. The effect of the new incentive program on the payback time of a typical glazed solar hot water system in Greece was investigated in this work. Long-term meteorological data from 47 stations are analyzed in order to evaluate the potential of solar water heater application at each site in Greece. The RETScreen software was used to predict the financial viability and the green house gas emissions reductions. The economical indicators showed that Tymbakion was the best site and Ioannina the worst. From the environmental point of view, it was found that on an average an approximate quantity of 1.47 ton of green house gases can be avoided entering into the local atmosphere each year.

- A13. A study of a transportable Thermal Neutron Radiography unit based on a compact RFI linac, **J. G. Fantidis**, *Journal of Radioanalytical and Nuclear Chemistry* 293 (2012) pages 95–101.

A transportable thermal neutron radiography system, incorporating a compact proton accelerator as neutron source has been simulated using the MCNP4B code. The neutron source will be produced via the  ${}^7\text{Li}(p,n){}^7\text{Be}$  reactions by a 2.5 MeV, 10 mA proton beam into a thick lithium target. Variable values for the collimator ratio were calculated. Thermal neutron radiography parameters are comparable to the research nuclear reactors. Sapphire filter was treated in order to improve the results. Simple and advanced neutron shielding materials considered which was further enhanced with layers of bismuth. The system was compatible with the European Union Directive on 'Restriction of Hazardous Substances' (RoHS) 2002/95/EC, hence excluding the use of cadmium and lead.

- A14. A hybrid wind and hydroelectric power production system in generation in Plaka, Alexandroupolis, Greece, **J. G. Fantidis**, V. C. Mantzari, E. Kalkani, D. V. Bandekas, N. Vordos, *International Journal of Advances in Engineering, Science and Technology* 2 (4) 2013 pages 376–385.

The primary objective of this study is to determine a hybrid system, which combines wind and hydraulic energy, able to supply the necessary electrical load of a typical community in a remote location in Plaka, Alexandroupolis, Greece. This is the first effort for utilization of wind and hydraulic energy potential of the aforementioned area. The obtained results prove that the development of a hybrid energy system is feasible, which uses a combination of renewable energy sources in this area, with satisfactory efficiency and without creating environmental pollution.

- A15. Evaluation of Renewable Energy Sources Exploitation at remote regions, using Computing Model and Multi-Criteria Analysis: A Case-Study in Samothrace, Greece, J. C. Mourmouris, C. Potolias, **J. G. Fantidis**, *International Journal of Renewable Energy Research* 2 (2) 2012 pages 307–316.

The exhaustion of conventional energy reserves (diesel, coal, gas etc.), coupled with environmental impacts, influence seriously sustainability aspects of the whole planet, both from an economic as well as an environmental point of view. The use of renewable energy resources for electricity generation is being promoted by most countries. The originality of the present study is that the exploitation of Renewable Energy Sources (RES) based not only on economical criteria, which derived from a HOMER software tool, but also on environmental, social and technical criteria using Multi-Criteria Analysis (MCA) for their evaluation. In this paper, a case study for the island of Samothrace, Greece is analyzed. Samothrace has a high potential for energy resource exploitation (mainly Wind and Solar), but has social acceptance problems because of its socioeconomic and environmental situation. The evaluation proposed help to select the most suitable alternatives.

A16. “Financial Crisis and the New Data on the Wood Pellet Heating: Case Study Of Greece”, **Jacob G. Fantidis**, Dimitrios V. Bandekas, Nick Vordos, Costas Potolias, Kostas Karakoulidis, *Research Journal of Applied Sciences* 7 (3) 2012 pages 138–145.

The acute financial crisis in Greece has brought new taxes on the diesel-oil price. The logic of substituting solid biomass for fossil fuels to produce heat is reinforced even more. The objective of this work is to estimate the new financial data. Long term meteorological data from 66 stations are analyzed in order to evaluate the financial feasibility of a pellet heating system at each site in Greece. The RETScreen software was used to predict the financial viability and the green house gas emissions reductions. Thoughts-results which arise from this crisis are also presented.

A17. “Financial and economic crisis and its consequences to the diesel-oil and biomass heating market-Case study of Greece”, **J. G. Fantidis**, D. V. Bandekas, C. Potolias, N. Vordos, *Journal of Electrical Systems* 8 (2) (2012) pages 249–261.

The financial and economic crisis in Greece has changed the balance between the fossil heating fuels and the biomass. Biomass is a renewable energy source and replaces fossil fuels in existing heat devices. The aim of this paper is to investigate the financial feasibility of a biomass heating system in Greece. The RETScreen software was used in order to predict the financial viability and the green house gas emissions reductions in cities which are placed in areas with very different climatic conditions.

A18. “Fast and thermal neutron radiographies based on a compact neutron generator”, **J. G. Fantidis**, D. V. Bandekas, C. Potolias, N. Vordos, *Journal of Theoretical and Applied Physics* 2012, 6:20.

Fast neutrons that are produced via compact neutron generators have been used for thermal and fast neutron radiographies. In order to investigate objects with different sizes and produce radiographs of variable qualities, the proposed facility has been considered with a wide range of values for the parameters characterizing the thermal and fast neutron radiographies. The proposed system is

designed according to article 4 of the Restriction of Hazardous Substances Directive 2002/95/EC, hence, excluded the use of cadmium and lead, and has been simulated using the MCNP4B code. The Monte Carlo calculations were carried out using three different neutron sources: deuterium-deuterium, deuterium-tritium, and tritium-tritium neutron generators.

A19. “Multiple Fast Neutron and Gamma-ray beam systems for the detection of illicit materials”, **J. G. Fantidis**, G. E. Nicolaou, *Journal of Radioanalytical and Nuclear Chemistry* 295 (2) (2013) pages 973–977.

Neutron and photon sources have been combined in order to assess the performance of these combinations to discriminate between materials of similar composition. The evaluation has been carried out on the basis of the maximum and minimum ratio values of the relative transmissions of high-energy gamma- or X-ray and neutrons. The number of materials with similar ratio values was used as an indicator of the effectiveness of each source combination. The use of three sources, instead of two, significantly improves the capability of neutron/photon combination to separate similar in composition materials.

A20. “The Replacement Of Research Reactors With A Compact Proton Linac For Neutron Radiography”, **J.G. Fantidis**, D.V. Bandekas, N. Vordos, *Radiation Physics and Chemistry* 86 (2013) pages 74–78.

The work presented here examines a neutron radiography facility, based on accelerator-driven compact neutron source, in order to find a suitable replacement for the facilities, which is based on research nuclear reactors. High-quality neutrons beam can be produced via the  ${}^9\text{Be}(p,n){}^9\text{B}$  reaction at proton energies of about 4 MeV. Except for the Be target the materials considered were compatible with the European Union Directive on ‘Restriction of Hazardous Substances’ (RoHS) 2002/95/EC. According to this directive some common materials in radiography units such as lead and cadmium have been excluded. The suggested facility has been simulated with an extensive range of parameters, which characterizes the neutron radiography, and the results specify that an accelerator-based neutron source is an attractive alternative to research nuclear reactors.

A21. “Cost of PV electricity – Case study of Greece”, **J.G. Fantidis**, D.V. Bandekas, C. Potolias, N. Vordos, *Solar Energy* 91 (2013) pages 120–130.

The potential for a 20 kW photovoltaic (PV) power plant in Greece is examined in this study. HOMER software is used to predict energy production, cost of energy and reduction of green house gasses (GHGs) emissions. The long-term meteorological parameters for 46 sites in Greece being considered by the Centre for Renewable Energy Sources and Saving (CRESS) are analyzed. The global solar radiation varies between a minimum of 4.04 kWh/m<sup>2</sup>/day in Ioannina and a maximum of 4.89 kWh/m<sup>2</sup>/day in Tymbakion, while the mean value for the 46 locations remained as

4.46 kWh/m<sup>2</sup>/day. The renewable energy produced each year from the PV power plant varied between 33.35 MW h in Ioannina and 41.63 MWh in Tymbakion while the average value for the 46 locations is 37.61 MWh. The results of the financial analysis demonstrate that a PV power plant can operate profitably at any of the considered sites in Greece. The capacity factor of a PV plant varies between 19.4% and 24.2% and the cost of electricity varies between 0.122 €/kWh and 0.152 €/kWh from the most appropriate location to the least attractive location respectively. Bearing in mind that the electricity cost for consumers in Greece is approximately 0.13 €/kWh, the present study demonstrates that photovoltaics can play an important role in Greek energy generation. Last but not least, utilization of photovoltaics means that considerable quantity of CO<sub>2</sub> is not released into the local atmosphere each year.

A22. “Optimised BNCT facility based on a compact DD neutron generator”, **J. G. Fantidis**, E. Saitioti, D.V. Bandekas, N. Vordos, *International Journal of Radiation Research* 11(4) (2013) pages 207–214.

MCNP4B Monte Carlo code was used with intention to calculate the optimum design parameters for a BNCT facility based on a portable D–D neutron generator. The materials considered were compatible with the European Union Directive on ‘Restriction of Hazardous Substances’ (RoHS) 2002/95/EC, hence excluding the use of cadmium, beryllium and lead. According to the MCNP4B simulations the combination of 18 cm TiF<sub>3</sub> and 18 cm of AlF<sub>3</sub> is the best moderator. A cone from D<sub>2</sub>O with length 6 cm and radii 5 and 4 cm can improve the quality of the beam. With intention to further optimize the quality of the neutron beam the presence of filters is vital, so an arrangement of 9 cm BiF<sub>3</sub> as spectrum shifter and  $\gamma$  rays filter, 6 cm of Ti and 2 cm of Li offer the desired epithermal neutron beam for BNCT. According to the results obtained although similarly to the other facilities which based on portable neutron sources the neutron flux is below the recommended value for clinical treatment; the proposed facility meets all the other recommended by IAEA parameters and constitute an attractive alternative for centers wishing to install a simple BNCT facility.

A23. “The study of the thermal profile of a three-phase motor under different conditions”, **J. G. Fantidis**, K. Karakoulidis, G. Lazidis, C. Potolias, D. V. Bandekas, *ARPN Journal of Engineering and Applied Sciences*, 8 (11) (2013) 892 – 899.

Infrared thermography is one of the most cost-effective predictive maintenance technologies which are quickly, accurately available without interrupting the operations and locate problems in various types of systems before any failure. Electrical thermography is the most widely performed application of Infrared thermography. It is used virtually around the world to evaluate the condition of electrical systems and equipment. Thermal imaging can help someone to track the temperature at which any electrical motor is operating, which is crucial to the longevity of the motor. This article

deals with the temperature measurements on an induction motor and describes the influence of parameters such as the relative humidity and the environmental temperature on the measured values.

A24. “Financial Crisis in Greece, economics evaluation of the replacement of heating diesel oil with a heat pump system”, C. Potolias, J. C. Mourmouris, **J. G. Fantidis**, D. V. Bandekas, A. Kourtidis, accepted for publication in *Inzinerine Ekonomika – Engineering Economics*, 25(2) (2014) 141–151.

The main goal of this work is to estimate the feasibility of a heat pump system as an alternative solution to the common heating diesel which is used in Greece. Based on the long-term meteorological data from 66 stations the financial feasibility of a heat pump heating system at each site in Greece was estimated. The RETScreen Clean Energy Project Analysis software was used in order to carry out the feasibility analysis and the green house gas emissions reductions. Generally Greece has a typical Mediterranean climate which means hot, dry summers and mild rainy winters with snow mainly at higher elevations. According to the heating degree-days the Greece can be divided in 4 climatic zones. Sensitivity analysis was realized for four cities, namely Rhodes, Athens/Filadelpia, Kavala and Kastoria, which are located in the first, second, third and fourth zone respectively. In accordance with the financial results in the first climatic zone where the heating demand is really low, the replacement of the heating oil systems with heat pump systems is not very profitable investment. In zone A based on the results from the RETScreen the payback period varies between 7 – 10.5 years, while for the poorest of citizens owing to government subsidy of 0.28€/l the payback period is between 9.8 – 14.5 years. In the second zone there are several financial benefits from using heat pump system instead of heating oil, the payback period fluctuates from 5.1 up to 6.9 years (without government grant) or from 7.3 up to 9.8 years (with government grant). In the climatic zone C a heat pump system seems provides considerable economic benefits, the relevant results showed that the payback period varies between 4.2 – 5 or 6 – 7.1 years without and with government subsidy. In the fourth climatic zone where the climate is similar with this in central Europe a heat pump system is a sound financial investment and the payback period is really short (3.2 – 4.2 years without government grant or 4.6 – 6.0 years with government grant).

A25. “Financial crisis in Greece, the reason for the replacement of heating diesel systems” **J. G. Fantidis**, D. V. Bandekas, C. Potolias, K. Karakoulidis, P. Kogias, *American Journal of Environmental Engineering and Science*. Vol. 2, No. 1, 2015, pp. 1–6.

In September 2009, Greek economic crisis exploded. The Greek government tried to resolve this "problem" with a loan from troika, with the requirement that the country will implement a wide array of austerity measures. The standard of living for the majority of the Greek citizens has changed drastically and the price of heating oil has become prohibitive for many of them. Due to



the country's geographical position, its rugged relief and its distribution between the mainland and the sea, there is great variation in Greece's climate. The aim of this paper is to evaluate the feasibility of different heating systems as an alternative solution to the existent heating diesel systems. The RETScreen software was used to predict the financial viability and the green house gas emissions reductions. Except from financial benefits utilization of alternatives fuels means that considerable quantity of CO<sub>2</sub> will not released into the local atmosphere each year.

A26. "Optimization study for BNCT facility based on a DT neutron generator", **J. G. Fantidis, A. Antoniadis**, accepted for publication in International Journal of Radiation Research13 (1), (2015) 13–24.

A Boron Neutron Capture Therapy (BNCT) facility, based on a DT neutron generator, with the final goal to find out a potential, alternative, solution to existing BNCT treatment facilities which are based on nuclear reactors is examined. With the aim of the MCNP4B Monte Carlo code different beam-shaping assembly (BSA) configurations were considered. Lead was selected as reflector material while CF<sub>2</sub>, D<sub>2</sub>O, Fluental, PbF<sub>4</sub>, PbF<sub>2</sub>, BiF<sub>3</sub>, BiF<sub>5</sub>, MgF<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, AlF<sub>3</sub>, TiF<sub>3</sub>, BeD<sub>2</sub>, CaF<sub>2</sub> and <sup>7</sup>LiF were examined as spectrum shifters. In order to improve the quality of the beam titanium, nickel-60, iron and titanium alloy (Ti<sub>6</sub>Al<sub>4</sub>V) were simulated as fast neutrons filters while lead and bismuth were considered as gamma filters. An extensive set of calculations performed with MCNP4B Monte Carlo code have shown that the combination of <sup>7</sup>LiF which accommodates a conic part made of D<sub>2</sub>O, then followed by a TiF<sub>3</sub> layer is the optimum moderator design. The use of three different materials for further reduction of fast neutrons, thermal neutrons and gamma rays is necessary. <sup>60</sup>Ni, Cd and Bi were chosen respectively for these purposes. The epithermal neutron flux obtained at the beam exit window turned out to be 3.94×10<sup>9</sup> n cm<sup>-2</sup> s<sup>-1</sup> while fulfilling all the recommended IAEA in-air Figure Of Merit (FOM) criteria. The assessment of the dose profiles in head phantom and the in-phantom FOM are also presented. The proposed assembly configuration may provide an attractive option for centers wishing to install a BNCT facility.

A27. "The temperature measurement of the windings in a three-phase electrical motor under different conditions", **J. G. Fantidis**, D. V. Bandekas, K. Karakoulidis, G. Lazidis, C. Potolias, Gazi University Journal of Science Part A: Engineering And Innovation GU J Sci Part:A 3(2):39-44 (2015)

Based on a portable and high-resolution infrared thermographic system, this work studies the temperature measurement of the windings in a three phase electrical motor. The electrical machine operated under two scenarios, without load and under full-load conditions. The full-load scenario presents considerably higher temperatures and requires more time in order to reach a steady temperature state. In order to evaluate how an overload condition affects the temperature of the

windings, we tested the machine under 10% overload for 15 minutes and the results proved that the temperature increases rapidly not only in the windings but also in the whole machine.

A28. “The comparison between simple and advanced shielding materials for the shield of portable neutrons sources”, **J. G. Fantidis**, International Journal of Radiation Research 13 (4), (2015) 287–295.

Monte Carlo simulations play a vital role in the calculation of the necessary shielding both for neutrons and photons. Advanced and simple shielding materials against neutron and gamma rays were compared by simulation using the MCNB4B Monte Carlo code. The simulations were carried out for the three common neutron sources, namely the  $^{252}\text{Cf}$ , the  $^{241}\text{Am/Be}$  and the DD neutron generator which are suitable for transportable facilities. The source has been simulated as sphere with 3 cm diameter while the necessary shielding is designed in the form of a sphere around the neutron source. The materials considered were chosen according to the EU Directive 2002/95/EC, hence excluding lead and cadmium. In the case of DD neutron generator the thickness, the weight and the volume of the shield can decrease up to 41.3, 44, and 78.4% correspondingly. With regard to the  $^{252}\text{Cf}$  neutron source the use of advanced shielding materials can reduce the corresponding parameters up to 32.7, 40.7, and 68.4% respectively. As regards the  $^{241}\text{Am/Be}$  neutron source, based on advanced shielding materials the thickness, the mass and the volume of the shield can decrease by 33.8, 49.5, and 70% respectively. The obtained results showed that the use of advanced shielding materials has led to reduce greatly the weight and the volume of the necessary shield.

A29. “A neutron radiography facility based on an experimental reactor”, D. T. Thomas, **J. G. Fantidis**, G. E. Nicolaou, Journal of Engineering Science and Technology Review 8.3 (2015) 61–64.

A thermal Neutron Radiography(NR) facility based on the use of thermal neutron flux, generated by the PULSTAR experimental reactor, has been designed and simulated using the MCNPX code. The key objective of the proposed facility is to deliver thermal neutron flux in this range for variable values of L/D ratio, instantaneously with acceptable values for all NR parameters. Thus, with suitable aperture and collimators designs, optimization for the parameters for thermal NR was achieved, for a wide range of the collimator ratio. The short time requirements for obtaining the radiography images justify the use of the proposed system for ‘real time radiography’. The system was designed under the limitation that the total Dose Equivalent Rate does not exceed at the external shield surface the limit recommended by ICRP-26.

A30. “Study of a Wind/PV/Battery hybrid system–Case study at Plaka in Greece”, **J. G. Fantidis**, D. V. Bandekas, N. Vordos. Journal of Engineering Science and Technology Review 8.5 (2015): 6–11.

The primary objective of this study is to determine the optimum hybrid system able to supply the necessary electrical load of a typical community in a remote location in Greece. The renewable energy systems were comprised of different combinations of PV modules and wind turbines supplemented with battery storage. A software tool, HOMER is used for the analysis. The hybrid system analysis has showed that the minimum cost of energy is 0.268 \$/kWh with 10% annual capacity of shortage. The optimum hybrid system is comprised of 1.5 kW PV array, 1 wind generator, 3 kW power converter and 14 storage batteries

A31. “Performance evaluation of roof-top PV systems in the area of Kavala North Greece”, **J. G Fantidis**, P. Constantinou, D. Bandekas, P. Kogias, E. Stathakis, K. Karakoulidis, K. Meresentoglou, Journal of Applied Engineering Science 13.4 (2015) 217–224.

The continuously growing demand for electricity and the need to develop Renewable Energy Sources (RES), pushed the modern world to develop Photovoltaic (PV) systems. An evaluation of performance of photovoltaic power systems was conducted, aiming to analyze the causes of performance reduction of the systems. During the years 2010 - 2013 was a period which was described as «fever of photovoltaic» systems installation in Greece. There were so blatant manufacturing defects mainly to the roof-top PV systems. Studying their location and construction method, radically different, even in neighboring systems we find that the reflection on the performance conditions are reasonable and easy to understand. This is the reason that leads us to make a research study regarding the performance differences of the roof-top PV systems and the causes of them. Mainly we deal more with the systems of low performance  $\leq 10\text{kW}$ , because they are more economical and interesting. In this paper, a study for the area of prefecture of Kavala, Greece is analyzed.

A32. “The Temperature Measurement in a Three-Phase Power Transformer under Different Conditions”, K. Karakoulidis, **J. G. Fantidis**, V. Kontakos, Journal of Engineering Science and Technology Review 8.5 (2015): 19–23.

Infrared thermography is a powerful non contact method with the ability to fast inspection of abnormal situations in many electrical systems and equipments. With the aim of a high resolution thermal camera a laboratory power transformer was checked under different scenarios. These scenarios include thermal measurements for 58%, 87% and 116% of rated load conditions, problems in primary or secondary phases and an asymmetric charge. The thermographic system illustrate fast and reliable the changes in the windings of the power transformer.

A33. “The temperature measurement of a single phase induction motor under different conditions”, K. Karakoulidis, **J. G. Fantidis**, C. Potolias, P. Kogias and D. V. Bandekas, ARPN Journal of Engineering and Applied Sciences 11(19) (2016) 11495-11502.

Infrared thermography is one of the most widely accepted non-destructive testing (NDT) and condition monitoring tools which is generally used in all sectors of the modern society such as the infrastructure, industries, service functions and the domestic sector. Electrical thermography is the most widely performed application of Infrared thermography. It is used in order to evaluate the condition of electrical systems and equipment. In this article the temperature measurement on a small induction single face motor under different scenarios has been realized.

A34. “A Fast Neutron and Gamma Ray System for the Detection of Illicit Materials Based on Simple Isotopic Sources”, **J. G. Fantidis**, A. Dalakas, C. Potolias, K. Karakoulidis and P. Kogias, *Journal of Engineering Science and Technology Review* 9 (6) (2016) 52–58.

A simple Fast Neutron Gamma Ray system based on a common neutron and gamma sources, namely  $^{252}\text{Cf}$  and  $^{137}\text{Cs}$ , has been simulated using the MCNP4B Monte Carlo code. More than 160 materials from different categories were considered and the simulations showed that the examined facility offers remarkable benefit in discrimination between illicit and not illicit materials. The use of three beams, rather than two, further improves the material discriminator

A35. “The comparison of different geometrical configurations and materials for Neutron Radiography purposes based on a  $^{241}\text{Am}/\text{Be}$  neutron source”, **J. G. Fantidis**, *Journal of Taibah University for Science* 11 (6) (2017) 1214–1220.

The present work examines two different geometrical configurations and three different lining materials suitable for thermal neutron radiography purposes based on a  $^{241}\text{Am}/\text{Be}$  neutron source. The same source was also used for fast neutron radiography intentions. Appropriate collimators were simulated for each of the radiography modes; comparing the effectiveness of the Cadmium, Gadolinium, and Boral as lining materials for thermal neutron radiography and evaluating the efficiency of the Iron and Tungsten as interior wall materials of the collimator in the case of fast neutron radiography. The presented facilities have been simulated for a wide range of values for the parameters characterising the neutron radiography using the MCNP4B Monte Carlo code.

A36. “Optimization of Beam Shaping Assembly design for Boron Neutron Capture Therapy based on a transportable proton accelerator”, **J. G. Fantidis** and G. Nicolaou, Accepted for publication in *Alexandria Engineering Journal* (2017), <https://doi.org/10.1016/j.aej.2017.08.004>.

The optimization of a Beam Shaping Assembly design for Boron Neutron Capture Therapy (BNCT), based on a commercial available proton accelerator, has been simulated. The primary goal is to improve the flux of the epithermal neutrons, which is the major drawback in all designed BNCT facilities with portable neutron source, satisfying simultaneously all the other relevant parameters. A BNCT facility has been simulated using the MCNP4B Monte Carlo code. A wide set of material were examined as moderators, while three different materials are used as fast neutron,

gamma ray and thermal neutrons filters. Fast neutrons from  ${}^9\text{Be}(p,n){}^9\text{B}$  reaction are moderated through the  ${}^7\text{LiF}$  and  $\text{TiF}_3$  moderators and further reduced using  ${}^{60}\text{Ni}$  as fast neutron filter. The undesired gamma rays and thermal neutrons are removed using Bi and Cd filters respectively. The therapeutic efficacy of the proposed facility was calculated through the dosimetric evaluation in a head phantom. According to the results of the calculations the proposed unit satisfies the recommended by IAEA parameters. Only the flux of the epithermal neutrons remains below the recommended threshold, but is significantly improved.

A37. P. Kogias, M. Negianni, **J. Fantidis**, F. Kogia, “Mathematical Analysis of a Parking System for Telemetry Applications”, *Journal of Applied Engineering Science* 16 (2018) 2, 519, 202–207.

In this paper we are using the waiting system theory and we make a mathematical analysis, to find the optimal solution for a smart parking system. We apply to the smart parking system the theory of one waiting system with many points of service, and for the compatible parking space. More specifically, according to the waiting system theory, we made a count of customers so we can see the number of customers trying to find a parking space. Then we mentioned the customers who arrive in the system either according to a known space or otherwise, at “random” mathematical times. In the “random” times that customers have come to the system, we have been helped by the distribution of Poisson. Thus, we have clearly seen the time of customer service as well as their positions in the system. In the end, we analyzed the models of Poisson distribution where each separately explains the cases of customers in the system and with mathematical equations we arrived at a right outcome. It is necessary to notice that, the following proof is a mathematical example to understand the proper use of a smart parking by using the Waiting system theory and Poisson distribution.

## JOURNAL IMPACT FACTORS

(το έτος δημοσίευσης)

A/A	Όνομα Περιοδικού	Impact Factor	Έτος Δημοσίευσης
1	Radiation Measurements	0.973	2009
2	Nuclear Instruments and Methods A	1.317	2009
		1.142	2010
		1.207	2011
3	Journal of Radioanalytical and Nuclear Chemistry	0.777	2010
		1.52	2011
		1.467	2012
		1.415	2013
4	Inzinerine Ekonomika – Engineering Economics	0.972	2012
		0.871	2014
5	Radiation Physics and Chemistry	1.189	2013
6	Solar Energy	3.541	2013
7	International Journal of Radiation Research	0.40	2013
		0.314	2015

- B1. Ερμηνεύοντας τη γλώσσα των ραδιοϊσοτόπων, Ν. Τσάγκας, **I. Φαντίδης**, Γ. Νικολάου, 11<sup>ο</sup> Πανελλήνιο Συνέδριο της Ένωσης Ελλήνων Φυσικών, Λάρισα 30–31 Μαρτίου, 1–2 Απριλίου 2006 (σελ 26).

Τα ραδιοϊσότοπα αποτελούν κύρια συστατικά της ύλης με χαρακτηριστικές ιδιότητες από το χρόνο ημιζωής τους, το είδος της ακτινοβολίας που εκπέμπουν και την ενέργεια αυτής της ακτινοβολίας. Η ύλη μπορεί να έχει δημιουργηθεί για παράδειγμα κατά το σχηματισμό της γης, από γεωλογικές μεταβολές ή κατά τη διάρκεια της ακτινοβόλησης υλικού με πυρηνική ακτινοβολία. Η περιεκτικότητα σε ραδόνιο για παράδειγμα είναι ένα αποτέλεσμα της ραδιενεργού διάσπασης του φυσικού ουρανίου σε ραδιοϊσότοπα. Ραδιοχρονολογήσεις πραγματοποιούνται με άνθρακα-14. Η ταυτοποίηση κάποιου άγνωστου υλικού μπορεί να πραγματοποιηθεί με την μέτρηση των ισοτόπων σε αυτό το υλικό. Οι χαρακτηριστικές ακτινοβολίες που εκπέμπονται από ισότοπα χρησιμοποιούνται ευρέως στην ιατρική και την τεχνολογία. Η εργασία αυτή παρουσιάζει μια σειρά παραδειγμάτων όπου πληροφορία και γνώση αντλούνται από τις χαρακτηριστικές ιδιότητες ή γλώσσα των ισοτόπων.

- B2. Identificacation of unknown nuclear material, **J. G. Fantidis**, G. E. Nicolaou, F.N. Tsagas, 16<sup>th</sup> Symposium of the Hellenic Nuclear Physics Society - Athens 26-27 May 2006, Greece. The identification of spent PWR nuclear fuel in terms of its initial enrichment and final burnup is demonstrated. Spent UO<sub>2</sub> fuel from a PWR power station was used as the nuclear material of supposed unknown irradiation history. The identification procedure was based on determining the U and Pu isotopic composition of the fuel by chemical analyses, simulation calculations of fuel evolution and statistical analysis. The procedures followed and associated limitations are discussed.

- B3. Localisation And Distribution Of Radioactivity In Soil: solid angle issue, **J. G. Fantidis**, G. E. Nicolaou, F.N. Tsagas, International Conference on Enviromental Radioactivity, Vienna 22-27 April 2007, Austria.

A mathematical approach is presented to describe the fields of view of different collimated detectors, evaluate the solid angle each subtends within a radioactive object and determine the solid angle subtended by the detectors combined within the object. The latter is the 3D region termed volume of intersection which allows small parts within a space to be studied. Hence, a radioactive source can be located or indeed a distribution of radioactivity in the case of a contamination can be determined. The evaluation of the solid angle subtended by a detector from a point is performed using a Monte Carlo approach utilizing total variance reduction.

- B4. Συγκριση Μεταφερομενων Πηγων για την Παραγωγη Ραδιογραφιων με Χρηση Θερμικων Νετρονιων, **I. Φαντιδης**, Γ. Νικολαου, Ν. Τσαγκας, 13<sup>ο</sup> Πανελλήνιο Συνέδριο της Ένωσης Ελλήνων Φυσικών Πάτρα , 17 – 21 Μαρτίου 2010.

Σκοπός της παρούσας εργασίας είναι η συγκριτική παρουσίαση φορητών πηγών για την παραγωγή ραδιογραφιών με τη βοήθεια θερμικών νετρονίων. Η επιλογή μόνο μεταφερόμενων πηγών έγινε με γνώμονα τη διεύρυνση των πεδίων εφαρμογών της νετρονικής ραδιογραφίας εξαιτίας ακριβώς αυτής της δυνατότητάς τους να μπορούν να μετακινηθούν. Συγκεκριμένα, με τη χρήση του λογισμικού MCNPX μελετήθηκαν και παρουσιάζονται έξι μεταφερόμενες πηγές. Πρόκειται για πηγή  $^{252}\text{Cf}$ , πηγή SbBe, DD και DT γεννητριών νετρονίων και νετρονίων που προκύπτουν με χρήση μεταφερόμενων επιταχυντών πρωτονίων σε στόχο Li ή Be. Η σύγκριση γίνεται με κριτήρια τη ροή των θερμικών νετρονίων, το λόγο του αριθμού των νετρονίων προς τη δόση που φτάνουν στο εξεταζόμενο δείγμα, την περιεκτικότητα της δέσμης νετρονίων σε θερμικά νετρόνια, τις απαιτήσεις θωράκισης και του κόστους της πηγής.

- B5. Techno-Economical Study of Hybrid Power System for a Remote Village in Greece, **J. G. Fantidis**, D. V. Bandekas, N. Vordos, 6<sup>th</sup> WSEAS International Conference on Renewable Energy Sources (RES '12), Porto 1-3 July 2012, Portugal.

The aim of this paper is to investigate the possibility of replacing diesel power generation with hybrid wind power systems in remote communities in Greece. Various renewable and non-renewable energy sources, energy storage methods and their applicability in terms of cost and performance are discussed. The cost of energy is the main parameter used to compare economic performances of the systems. A software tool, Hybrid Optimization Model for Electric Renewables (HOMER) is used for the analysis. Sensitivity analysis was done in order to understand the most important parameters influencing the economic performances of the systems and to define possible future scenarios of competitiveness between technologies. The environmental considerations discussed are the amount of gas emissions, such as CO<sub>2</sub> and NO<sub>x</sub>, as well as particulate matter released into the atmosphere.

- B6. Design and Simulation of Hybrid Power System with Wind Turbines, Photovoltaics and Fuel Cells”, N. Vordos, D. V. Bandekas, J. W. Nolan, **J. G. Fantidis**, A. Ioannou, “Recent Advances in Energy, Environment and Development, Cambridge, January 30 - February 1, 2013, USA.

In this paper we present a hybrid system that combines wind turbines, photovoltaics and fuel cells for the production of energy for a remote load. The wind turbines and solar panels are used as the main energy sources and fuel cells are used to store the produced energy. A remote site of five houses was used to study during the summer, which is a period of high consumption, and the winter, a low consumption period. The operating system is simulated with real weather data and all the curves functions are calculated.



- B7. “Wind Energy Potential in Greece Using a Small Wind Turbine”, **J. G. Fantidis**, D. V. Bandekas, N. Vordos, S. Karachalios, Recent Advances in Energy, Environment and Development, Cambridge, January 30 - February 1, 2013, USA.

The aim of this study is to outline the wind speed distribution in Greece and examine the potential of using this resource for generation of wind power in the country. Long-term wind speed data from 69 stations are analyzed in order to calculate the energy output for a small 2.5 kW installed wind turbine at each site in Greece. The Homer software was used to predict the energy production, the cost of energy and the green house gas emissions reductions.

- B8. “Output – feedback controller design in a Multimachine Power System”, D.V. BANDEKAS, N. VORDOS, **J. FANTIDIS**, WSEAS 15th International Conference on Automatic Control, Modelling and Simulation (ACMOS’13), Brasov, Romania, June 1-3, pp. 365 – 369, 2013.

In this work an alternate systematic procedure is proposed for the control of a multimachine power system. An efficient pole (eigenvalue) assignment algebraic control method using output – feedback have been extended to apply to the design of controllers in a multimachine power system. This method has been employed to design suitable (implementable) controllers with easily measurable state variables (i.e. closed loop system models with significantly enhanced dynamic stability characteristics) for a power system model developed by Yu and Fleming. The dynamic responses, following a step disturbance by digital simulation, presented which shows that the controller performs satisfactorily in a multimachine environment.

- B9. “Modelling and Simulation for a Multimachine Power System”, D.V. BANDEKAS, N. VORDOS, **J. FANTIDIS**, WSEAS 15<sup>th</sup> International Conference on Automatic Control, Modelling and Simulation (ACMOS’13), Brasov, Romania, June 1–3, pp. 370 – 374, 2013.

This paper presents a new modelling and simulation method for the dynamic performance analysis of a multimachine power system under symmetrical and unsymmetrical fault conditions. This method is called dynamic voltage - current combination method and the transient analysis of the system is based on a -d- c phase coordinate system. Modeling and simulation technique using digital computer with the appropriate software has also been described.

- B10. “Adaptive Control Method Applied to a Hydro Generator in a Multimachine Power System”, D.V. Bandekas, N. Vordos, **J. Fantidis**, Recent Advances in Energy, Environment, Biology and Ecology, Proceedings of the 10<sup>th</sup> WSEAS International Conference on Energy, Environment, Ecosystems and Sustainable Development (EEESD '14), pp. 70 – 75, 10-12 January 2014, Tenerife, Spain.

An excitation control method using state feedback is applied to a hydro- turbine synchronous generator in a multimachine power system, while an unsymmetrical fault or a three phase symmetrical fault being applied. The simulation results of the study show that the excitation controller performs satisfactorily in a multimachine environment, when operating in conjunction

with the conventional regulators of the other system generators. The proposed method for designing implementable robust excitation controllers is relatively simple to apply, as amply verified by the example given and relevant system simulations.

B11. “The Evaluation on Dual, Triple and Quadruple Energy X-Ray Systems for the Material Characterisation of a Suspicious Bulky Object”, **J. G. Fantidis**, D. V. Bandekas, P. Kogias, N. Vordos, Recent Advances in Energy, Environment, Biology and Ecology, Proceedings of the 10<sup>th</sup> WSEAS International Conference on Energy, Environment, Ecosystems and Sustainable Development (EEESD '14), pp. 143 – 148, 10-12 January 2014, Tenerife, Spain. Based on <sup>60</sup>Co, <sup>137</sup>Cs and <sup>88</sup>Y gamma ray sources and two X- ray sources with 4 MeV and 9 MeV end point energies with Bremsstrahlung spectra, 10 dual beam, 10 triple beam and 4 quadruple beam systems have been simulated using the MCNP4B Monte Carlo code. 165 materials from all categories were examined in order to evaluate the performance of each system. The simulations demonstrate that the combination of more than two sources in the same facility offer valuable extra information in materials discrimination.

B12. “Study of a Wind/PV/Battery Hybrid System at Plaka in Greece”, **J. G. Fantidis**, D. V. Bandekas, N. Vordos, Ch. Fylaktakidis, J. W. Nolan, 2<sup>nd</sup> International Conference on Power Engineering, Energy and Electrical Drives (PEED '14) Istanbul, Turkey December 15-17, 2014.

The primary objective of this study is to determine the optimum hybrid system able to supply the necessary electrical load of a typical community in a remote location in Greece. The renewable energy systems were comprised of different combinations of PV modules and wind turbines supplemented with battery storage. A software tool, HOMER is used for the analysis. The hybrid system analysis has showed that the minimum cost of energy is 0.268 \$/kWh with 10% annual capacity of shortage. The optimum hybrid system comprised of 1.5 kW PV array, 1 wind generator, 3 kW power converter, and 14 storage batteries.

B13. “Optimization of Beam Shaping Assembly Design for Boron Neutron Capture Therapy Based on a Compact Proton Accelerator”, **J. G. Fantidis**, E. Mitka, 3<sup>rd</sup> ENMF (*Exploring Novel Medical Frontiers*), Thessaloniki, Greece January 26-28, 2018.

Clinical trials of the Boron Neutron Capture Therapy (BNCT) have demonstrated that is an effective and promising way of treatment for cancers that have proven to be resistant to more conventional therapies. BNCT is based on the radiation damage produced by high Linear Energy Transfer particles emitted in the <sup>10</sup>B neutron capture reaction <sup>10</sup>B(n,a)<sup>7</sup>Li. Thermal neutrons are suitable for the tumors which are located at near-tissue-surface however, previous works have shown that epithermal neutrons are the best choice for treatment of a deep-seated tumors. There are several techniques to produce epithermal beams of neutrons either using nuclear reactors or a particle accelerator. Nuclear reactors provide high-intensity neutron beams, however, have a

numerous drawbacks: are very expensive and too large to be used in hospitals. The development and application of accelerator-based neutron sources for BNCT are therefore strongly desired. The goal of this work is to design a BNCT facility, based on a compact linear accelerator which fulfills the IAEA recommended.

#### **VI. ΚΡΙΤΗΣ ΣΕ ΠΕΡΙΟΔΙΚΑ**

- Journal of Radioanalytical and Nuclear Chemistry
- Nuclear Science and Techniques
- Nuclear Engineering and Design
- Applied Radiation and Isotopes
- Journal of Cleaner Production
- Engineering Economics
- International Journal of Radiation Research
- Journal of Engineering Science and Technology Review
- Neural Computing and Applications
- Journal of Scientific Research and Reports
- Journal of Applied Physical Science International
- British Journal of Applied Science & Technology
- Archives of Current Research International (as Academic Editor)

## ΠΑΡΑΘΕΣΕΙΣ

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