
Education	Doctor of Philosophy March 2001 – Dec. 2007	Electrical Engineering and Computer Science, MIT, Cambridge, MA. Advisor: Professor Dimitri A. Antoniadis. Thesis: <i>Transport Enhancement Techniques for Nanoscale MOSFETs.</i>
	Master of Science Sept. 1997 – Sept. 1999	Electrical and Computer Engineering, University of Tehran, Tehran, Iran. Advisor: Professor Shamsoddin Mohajerzadeh. Thesis: <i>Silicide and Germanide Materials for Semiconductor Sensors.</i>
	Bachelor of Science Sept. 1994 – Sept. 1997	Electrical and Computer Engineering, University of Tehran, Tehran, Iran.
Research Experience	Postdoctoral Associate Jan. 2008 – to date	Microsystems Technology Laboratory, MIT, Cambridge, MA. <ul style="list-style-type: none"> • Design, fabrication, and characterization of tunnel transistors.
	Graduate Research Assistant March 2001 – Dec. 2007	Microsystems Technology Laboratory, MIT, Cambridge, MA. <ul style="list-style-type: none"> • Explored performance limits of nanoscale MOSFETs. • Fabricated and characterized germanium-channel MOSFETs. Explored carrier transport in novel channel materials and strained semiconductors.
	Graduate Research Assistant May 1997 – Feb. 2001	Thin Film Laboratory, University of Tehran, Tehran, Iran. <ul style="list-style-type: none"> • Fabricated and characterized low-temperature thin-film transistors. • Fabricated and characterized thin-film piezoresistive sensors. • Contributed to the fabrication of novel plasma display arrays.
	Graduate Research Assistant Sept. 1998 – Sept. 2000	VLSI Circuits and Systems Laboratory, University of Tehran, Tehran, Iran. <ul style="list-style-type: none"> • Contributed to the design of a 900 MHz class-E power amplifier in 0.35um CMOS. • Contributed to the design of a 1-volt bulk-driven CMOS opamp.
	Teaching Experience	
Teaching Assistant Sept. 2006 – Dec. 2006	Physics of Microfabrication: Front End Processing, MIT.	
Course Coordinator Jan. 2000 – Apr. 2000	Data Converters, University of Tehran.	
Teaching Assistant Jan. 1999 – Sept. 1999	Analog CMOS, University of Tehran	
Teaching Assistant Sept. 1997 – Jan. 1999	Electronics I, University of Tehran	
Teaching Assistant Sept. 1998 – Jan. 1999	Semiconductor Sensors, University of Tehran	
Work Experience	Design Engineer Apr. 2000 – Feb. 2001	Ravesh Co., Tehran, Iran. Designed a 50 MHz, 10-bit, pipeline ADC in 0.25um CMOS. Responsible for the feasibility study of the company's powerline modem.
	Consultant Sept. 2002 – June. 2003	Center for E-Learning, University of Tehran Developed standards and guidelines for course development.

**Journal
Publications**

1. A. Khakifirooz and D. A. Antoniadis, "MOSFET performance scaling – Part I: Historical trends," to be published in *IEEE Trans. Electron Devices*.
2. A. Khakifirooz and D. A. Antoniadis, "MOSFET Performance scaling – Part II: Future directions," to be published in *IEEE Trans. Electron Devices*.
3. D. A. Antoniadis, A. Khakifirooz, I. Åberg, and J. L. Hoyt, "Channel material innovations for continuing the historical MOSFET performance increase with scaling," *ECS Transactions*, vol. 3, no. 7, pp. 3-15, 2006.
4. D. A. Antoniadis, I. Åberg, C. N. Chleirigh, O. Nayfeh, A. Khakifirooz, and J. L. Hoyt, "Continues MOSFET performance increase with device scaling: the role of strain and channel material innovations," *IBM J. Research Development*, vol. 50, no. 4, pp. 363-376, 2006.
5. A. Ritenour, R. Z. Lei, A. Dimoulas, G. Mavrou, Y. Panayiotatos, A. Khakifirooz, D. A. Antoniadis, and W. Tsai, "Sub 1-nm EOT germanium p-MOSFETs fabricated using molecular beam deposited high-k/metal gate stack," *Appl. Phys. Lett.*, vol. 88, p. 132107, 2006.
6. A. Khakifirooz and D. A. Antoniadis, "Scalability of hole mobility enhancement in biaxially strained ultrathin body SOI," *IEEE Electron Device Lett.*, vol. 27, no. 5, pp. 402-404, 2006.
7. D. Shahrjerdi, B. Hekmatshoar, A. Afzali-Kusha and A. Khakifirooz, "Optimization of the V_T -control method for low-power ultra-thin double-gate SOI logic circuits", *Integration, the VLSI Journal*, vol. 38, no. 3, pp. 505-513, 2005.
8. M. Fathipour, E. Fathi, B. Afzal, and A. Khakifirooz, "An improved shift-and-ratio L_{eff} extraction method for MOS transistors with halo/pocket implants," *Solid-State Electronics*, vol. 48. no. 10, pp. 1829-1832, 2004.
9. D. Shahrjerdi, M. Fathipour, B. Hekmatshoar and A. Khakifirooz, "An Approach to Low-cost Fabrication of Lateral COOLMOS Structures," *Solid State Electronics*, vol. 48, no. 10-11, pp. 1953-1957, 2004.
10. A. Khakifirooz and D. A. Antoniadis, "On the electron mobility in ultra-thin SOI and GOI," *IEEE Electron Device Lett.*, vol. 25, no. 2, pp. 80-82, Feb. 2004.
11. B. Hekmatshoar, D. Shahrjerdi, S. Mohajerzadeh, and A. Khakifirooz, "High obility poly-Ge TFTs on flexible plastic fabricated at 130°C," *J. Electronic Materials*, vol. 33, no. 4, pp. 353-357, 2004.
12. B. Arvan, A. Khakifirooz , R. Tarighat, S. Mohajerzadeh, A. Goodarzi, E. Asl. Soleimani and E. Arzi, "Atmospheric pressure chemical vapor deposition of titanium dioxide films from $TiCl_4$," *Materials Science and Engineering B*, vol. 109, no. 1-3, pp. 17-23, 2004.
13. B. Hekmatshoar, D. Shahrjerdi, S. Mohajerzadeh, A. Khakifirooz, M. Robertson, A. Tonita, and C. Bennett, "Low temperature stress-assisted germanium-induced crystallization of silicon-germanium alloys on flexible plastic," *J. Vacuum Science and Technology A*, vol. 22, no. 3, pp. 856-858, 2004.
14. B. Hekmatshoar, D. Shahrjerdi, S. Mohajerzadeh, A. Khakifirooz, A. Goodarzi, and M. Robertson, "Low temperature crystallization of germanium on plastic by externally applied compressive stress," *J. Vacuum Science Technology A*, vol. 21, no. 3, pp. 752-755, 2003.
15. L. Rezaee, S. S. Mohajerzadeh, and A. Khakifirooz, "Fabrication of poly-Si TFT's on glass with a novel method of back-reflecting low-temperature UV-assisted nickel-induced crystallization," *Solid-State Electronics*, vol. 47, pp. 361-366, 2003.
16. L. Rezaee, A. Khakifirooz, and S. Mohajerzadeh, "Low-temperature crystallization of a-Si using a novel back-reflecting UV-assisted metal-induced crystallization," *J. Non-Crystalline Solids*, vol. 303, no. 2, pp. 232-236, May 2002.
17. A. Khakifirooz, S. Haji, S. S. Mohajerzadeh, R. Shafiiha, and E. Asl Soleimani "Piezoresistive thin-film germanium strain gauges with reduced thermal sensitivity," *Sensors and Materials*, vol. 14, no. 2, pp. 67-76, 2002.
18. A. Khakifirooz, S. S. Mohajerzadeh, and S. Haji, "Field-assisted metal-induced crystallization in amorphous silicon films," *J. Vacuum Science and Technology*, vol. 19, no. 5, pp. 2453-2455, Sept. 2001.
19. A. Khakifirooz, S. Haji, and S. S. Mohajerzadeh, "UV-assisted nickel-induced crystallization of amorphous silicon," *Thin Solid Films*, vol. 383, no. 1-2, pp. 241-243, Feb. 2001.

- Conference Presentations**
1. A. Khakifirooz and D. A. Antoniadis, "Prospects of performance scaling for high-performance CMOS," to be presented at *European Solid-State Device Research Conf.*, 2008. **(Invited)**
 2. A. Khakifirooz, A. Ritenour, J. Hennessy, and D. A. Antoniadis, "Investigation of poor carrier transport in germanium NFETs," presented at *IEEE Semiconductor Interface Specialists Conf.*, Arlington, VA, Dec. 2007.
 3. A. Khakifirooz and D. A. Antoniadis, "MOSFET performance scaling: the role of virtual source velocity and its mobility dependence," *Int. Electron Device Meeting*, San Francisco, CA, Dec. 11-13, 2006.
 4. M. Riazati, A. Sobhani, M. Mottaghi-Dastjerdi, A. Afzali-Kusha, and A. Khakifirooz, "Low-power multiplier with static decision for input manipulation," *Proc. IEEE Int. Symp. Circuits Systems*, pp. 2721-2724, 2006.
 5. H. Parandeh-Afshar, A. Afzali-Kusha, and A. Khakifirooz, "A very high performance address BUS encoder," *Proc. IEEE Int. Symp. Circuits Systems*, pp. 1731-1734, 2006.
 6. D. A. Antoniadis, A. Khakifirooz, I. Åberg, C. N. Chleirigh, O. Nayfeh, and J. L. Hoyt, "Channel material innovation for continuing the historical MOSFET performance increase with scaling," *ECS Fall Meeting*, Mexico, Oct. 29-Nov. 3, 2006. **(Invited)**
 7. C. Vaishnav, A. Khakifirooz, and M. Devos, "Punishing by rewards: when the performance bell-curve stops working for you," *24th Int. Conf. System Dynamics Soc.*, Nijmegen, Netherland, July 23 - 27, 2006.
 8. A. Khakifirooz, O. M. Nayfeh, M. L. Lee, E. Fitzgerald, and D. A. Antoniadis, "Metal germanide Schottky contacts to relaxed and strained germanium," *52th Int. AVS Symp.*, Boston, MA, Nov. 2005.
 9. J. Koohsorkhi, Y. Adibi, S. Mohajerzadeh, J. Derakhshandeh, H. Hosseinzadegan, and A. Khakifirooz, "Application of encapsulated PECVED-grown carbon nano-structure field-emission devices in nanolithography," *NSTI Nanotechnology Conf.*, Anaheim, CA, May 8-12, 2005.
 10. A. Khakifirooz, O. M. Nayfeh, and D. A. Antoniadis, "Assessing the performance limits of ultra-thin double-gate MOSFETs: silicon vs. germanium," *IEEE Int. SOI Conf.*, Charleston, SC, Oct. 2004.
 11. B. Hekmatshoar, D. Shahrjerdi, S. Mohajerzadeh, A. Khakifirooz, M. Robertson, and E. Asl Soliemani, "Polycrystalline germanium and silicon-germanium alloys on plastic for realization of thin-film transistors," *MRS Spring Meeting*, vol. 811, San Francisco, CA, Apr. 2004.
 12. A. Behnam, B. Hekmatshoar, S. Mohajerzadeh, B. Arvan, F. Karbassian, and A. Khakifirooz, "A study of APCVD-deposited TiO₂ characteristics in the structure of a tunneling transistor," *MRS Spring Meeting*, vol. 814, San Francisco, CA, Apr. 2004.
 13. D. Shahrjerdi, B. Hekmatshoar, A. Afzali-Kusha, and A. Khakifirooz, "Optimization of the V_T-control method for low-power ultra-thin double-gate SOI logic circuits," *Great Lakes Symp. VLSI*, Boston, MA, 2004.
 14. D. Shahrjerdi, B. Hekmatshoar, A. Khakifirooz, and M. Fathipour, "An approach to low-cost fabrication of lateral CoolMOS structure," *Int. Semiconductor Device Research Symp.*, Washington, D.C., Dec. 10-12, 2003.
 15. E. Fathi, B. Afzal, M. Fathipour, and A. Khakifirooz, "An improved shift-and-ratio L_{eff} extraction method for MOS transistors with halo/pocket implants," *Int. Semiconductor Device Research Symp.*, Washington, D.C., Dec. 10-12, 2003.
 16. B. Hekmatshoar, D. Shahrjerdi, S. Mohajerzadeh, A. Afzali-Kusha, and A. Khakifirooz, "Stress-assisted copper-induced lateral growth of polycrystalline germanium," *MRS Fall Meeting*, Boston, MA, 2003.
 17. B. Hekmatshoar, D. Shahrjerdi, S. Mohajerzadeh, A. Khakifirooz, M. Robertson, A. Tonita, and C. Bennett, "Low temperature stress-assisted germanium-induced crystallization of silicon-germanium alloys on flexible plastic," *11th Canadian Semiconductor Tech. Conf.*, Ottawa, ON, Aug. 2003.
 18. B. Hekmatshoar, D. Shahrjerdi, S. Mohajerzadeh, and A. Khakifirooz, "High mobility poly-Ge TFTs on flexible plastic fabricated at 130°C," *IEEE Device Research Conf.*, Salt Lake City, June 23-25, 2003.
 19. A. Khakifirooz, B. Arvan, R. Tarighat, and S. Mohajerzadeh, "Atmospheric pressure chemical vapor deposition of titanium oxide films from TiCl₄ precursor," *EMRS Spring Meeting*, Strasbourg, France, June 2003.
 20. B. Hekmatshoar, D. Shahrjerdi, S. Mohajerzadeh, A. Khakifirooz, A. Akhavan, and M. Robertson, "Low temperature copper-induced crystallization technique for germanium on flexible PET by means of mechanical compressive stress," *MRS Spring Meeting*, San Francisco, CA, Apr. 2003.
 21. J. Derakhshandeh, N. Golestani, S. Mohajerzadeh, A. Khakifirooz, and M. Robertson, "Field-aided germanium-induced crystallization of amorphous silicon on glass," *MRS Spring Meeting*, San Francisco, CA, Apr. 2003.

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- Conference Presentations**
22. A. Khakifirooz and D. A. Antoniadis, "Effect of back-gate biasing on the performance and leakage control in deeply scaled SOI MOSFETs," *IEEE Int. SOI Conf.*, Oct. 2002.
 23. L. Rezaee, A. Akhavan, S. Mohajerzadeh, and A. Khakifirooz, "Low-temperature lateral crystallization of amorphous silicon on glass," *MRS Spring Meeting*, San Francisco, CA, 2002.
(Received MR S Graduate Student Silver Medal)
 24. S. Ashtiani, A. Khakifirooz, and O. Shoaee, "Switched-capacitor band-pass sigma-delta modulator with 4x parallelism," *Int. Symp. Signals, Circuits, and Systems*, Iasi, Romania, July 10-11, 2001.
 25. A. Goodarzi, A. Akhavan, S. Mohajerzadeh, M. Gitibin, A. Miri, A. Khakifirooz, and E. Asl Soleimani, "A novel lateral pixel structure for plasma display panels," *SID Meeting*, San Jose, CA, June 2001.
 26. K. Naeli, S. Mohajerzadeh, A. Khakifirooz, S. Haji, and E. Asl Soleimani, "A new field-aided Ge-induced lateral crystallization of silicon," *MRS Spring Meeting*, San Francisco, CA, 2001.
 27. L. Rezaee, S. Mohajerzadeh, A. Khakifirooz, S. Haji, and E. Asl Soleimani, "A novel back-reflecting UV-assisted metal-induced crystallization," *MRS Spring Meeting*, San Francisco, CA, 2001.
 28. B. Nejati, A. Khakifirooz, S. J. Ashtiani, and O. Shoaee, "Pipeline analog-to-digital converters with radix<2," *12th Int. Conf. Microelectronics*, Tehran, Iran, Oct. 31 – Nov. 2, 2000.
 29. A. Khakifirooz, S. Haji, S. S. Mohajerzadeh, and E. Asl Soleimani, "Structural improvement of amorphous silicon using metal-induced crystallization," *12th Int. Conf. Microelectronics*, Tehran, Iran, Oct. 31 – Nov. 2, 2000.
 30. A. Khakifirooz, S. S. Mohajerzadeh, and S. Haji, "Field-assisted metal-induced crystallization in amorphous silicon films," *47th American Vacuum Soc. Symp.*, Boston, 2-6 Oct., 2000.
 31. A. Khakifirooz, S. Haji, and S. S. Mohajerzadeh, "UV-assisted nickel-induced crystallization of amorphous silicon," *E-MRS IUMRS ICEM*, Strasbourg, France, May 2000.
 32. F. Bahmani, S. M. Fakhraie, and A. Khakifirooz, "A rail-to-rail, 1-volt, constant-g_m CMOS opamp," *IEEE Int. Symp. Circuits and Systems*, Geneva, Switzerland, May 2000.
 33. A. Khakifirooz, S. S. Mohajerzadeh, S. Haji, and E. Asl Soleimani, "Effect of copper-induced recrystallization on the piezoresistivity of germanium films," *MRS Spring Meeting*, San Francisco, CA, April 2000.
 34. A. Khakifirooz, S. S. Mohajerzadeh, and E. Asl Soleimani, "A miniaturized thin-film germanium strain gauge suitable for mass-production," *IMACS/IEEE CICC*, pp. 3571-3574, 1999.
 35. A. Khakifirooz, S. S. Mohajerzadeh, and R. Shafiqi, "A miniaturized thin-film germanium strain gauge," *Int. Conf. Microelectronics*, pp. 71-74, 1999.
- Invited Talks**
1. A. Khakifirooz and D. A. Antoniadis, "MOSFET performance scaling – What matters: transport or parasitics?" IMEC, Leuven, Belgium, July 2007.
 2. A. Khakifirooz and D. A. Antoniadis, "MOSFET performance scaling – What matters: transport or parasitics?" IBM Watson Laboratory, Yorktown Heights, NY, May 2007.
 3. A. Khakifirooz and D. A. Antoniadis, "Transistor performance scaling," *Workshop on Gate Stack and Contact Engineering for sub-30nm FETs*, Monterey, CA, Sept. 2006.
- Professional Activities**
- Member of the Process Technology Committee** **Microsystems Technology Laboratories, MIT**, Cambridge, MA.
Sept. 2004 – Sept. 2005 Reviewed more than 200 process proposals submitted by fab users.
- Reviewer**
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| <i>IEEE Electron Device Letters</i> | <i>Journal of Vacuum Science and Technology</i> |
| <i>IEEE Transactions on Electron Devices</i> | <i>Solid State Electronics</i> |
| <i>Journal of Applied Physics</i> | <i>Integration, The VLSI Journal</i> |
| <i>Applied Physics Letters</i> | <i>Iranian Journal of Electrical and Computer Engineering</i> |
| <i>IEEE Microwave and Wireless Component Letters</i> | |
| <i>IEEE Transactions on Nanotechnology</i> | |
- Grant Reviewer** **Austrian Science Fund**
- Member of the Organizing Committee** **12th International Conference on Microelectronics (ICM)**, Tehran, Iran.
- Founder and Chair** **IEEE ED/SSC Chapter, University of Tehran**, Tehran, Iran.