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3. SEC USE ONLY

4. CITIZENSHIP OR PLACE OF ORGANIZATION

Delaware

5. SOLE VOTING POWER

1,797,400

NUMBER OF
SHARES
BENEFICIALLY
OWNED BY
EACH
REPORTING
PERSON
WITH

6. SHARED VOTING POWER

0

7. SOLE DISPOSITIVE POWER

1,797,400

8. SHARED DISPOSITIVE POWER

0

9. AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON

1,797,400

10. CHECK IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES
(SEE INSTRUCTIONS)

11. PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (9)

7.93%

12. TYPE OF REPORTING PERSON (SEE INSTRUCTIONS)

IA

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1. NAMES OR REPORTING PERSONS

S.S. OR I.R.S. IDENTIFICATION NOS. OF ABOVE PERSONS

James H. Simons

2. CHECK APPROPRIATE BOX IF A MEMBER OF A GROUP (SEE INSTRUCTIONS):

(a)

(b)

3. SEC USE ONLY

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4. CITIZENSHIP OR PLACE OF ORGANIZATION

United States

	5.	SOLE VOTING POWER	
			1,797,400
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH	6.	SHARED VOTING POWER	0
	7.	SOLE DISPOSITIVE POWER	1,797,400
	8.	SHARED DISPOSITIVE POWER	0

9. AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON

1,797,400

10. CHECK IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES (SEE INSTRUCTIONS)

11. PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (9)

7.93%

12. TYPE OF REPORTING PERSON (SEE INSTRUCTIONS)

IN

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Item 1.

(a) Name of Issuer.

Mercury Computer Systems, Inc.

(b) Address of Issuer's Principal Executive Offices.

199 Riverneck Road
Chelmsford, MA 01824

Item 2.

(a) Name of Person Filing.

This Schedule 13G is being filed by Renaissance Technologies LLC ("RTC") and James H. Simons ("Simons").

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(b) Address of Principal Business Office or, if none, Residence.

The principal business address of the reporting persons is:

800 Third Avenue
New York, New York 10022

(c) Citizenship.

Dr. Simons is a United States citizen and
RTC is a Delaware limited liability company

(d) Title of Class of Securities.

Common Stock, \$0.01 par value

(e) CUSIP Number.

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Item 3. If this statement is filed pursuant to Rule 13d-1(b) or 13d-2(b) or (c), check whether the person filing is a:

- (a) Broker or dealer registered under Section 15 of the Act.
- (b) Bank as defined in Section 3(a)(6) of the Act.
- (c) Insurance Company as defined in Section 3(a)(19) of the Act.
- (d) Investment Company registered under Section 8 of the Investment Company Act.
- (e) Investment Adviser in accordance with Sec. 240.13d-1(b)(1)(ii)(E).
- (f) Employee Benefit Plan or Endowment Fund in accordance with Sec. 240.13d-1(b)(1)(ii)(F).
- (g) Parent holding company, in accordance with Sec. 240.13d-1(b)(ii)(G).
- (h) A savings association as defined in Section 3(b) of the Federal Deposit Insurance Act.
- (i) A church plan that is excluded from the definition of an investment company under Section 3(c)(14) of the Investment Company Act of 1940.
- (j) Group, in accordance with Sec. 240.13d-1(b)(1)(ii)(J).

If this statement is filed pursuant to Sec. 240.13d-1(c), check this box .

Item 4. Ownership

(a) Amount Beneficially Owned.

RTC: 1,797,400 shares

Simons: 1,797,400 shares, comprising the shares beneficially owned by RTC, because of Dr. Simons' position as control person of RTC.

(b) Percent of Class. RTC: 7.93%
Simons: 7.93%

(c) Number of shares as to which each such person has

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(i)	sole power to vote or to direct the vote:	RTC: 1,797,400
		Simons: 1,797,400
(ii)	shared power to vote or to direct the vote:	0
(iii)	sole power to dispose or to direct the disposition of:	RTC: 1,797,400
		Simons: 1,797,400
(iv)	shared power to dispose or to direct the disposition of:	0

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Item 5. Ownership of Five Percent or Less of a Class.

If this statement is being filed to report the fact that as of the date hereof the reporting person has ceased to be the beneficial owner of more than five percent of the class of securities, check the following

Item 6. Ownership of More than Five Percent on Behalf of Another Person.

Certain funds and accounts managed by RTC have the right to receive dividends and proceeds from the sale of the securities which are the subject of this report. RIEF Trading LLC holds of record more than 5% of such securities.

Item 7. Identification and Classification of the Subsidiary Which Acquired the Security Being Reported on by the Parent Holding Company or Control Person.

Not applicable.

Item 8. Identification and Classification of Members of the Group.

Not applicable.

Item 9. Notice of Dissolution of Group.

Not applicable.

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Item 10. Certification.

By signing below I certify that, to the best of my knowledge and belief, the securities referred to above were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of the issuer of the securities and were not acquired and are not held in connection with or as a participant in any transaction having that purpose or effect.

SIGNATURE

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

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Date: February 12, 2008

/s/ James H. Simons

James H. Simons

Renaissance Technologies LLC

By: /s/ Mark Silber

Mark Silber
Executive Vice President

Attention: Intentional misstatements or omissions of fact constitute
Federal criminal violations (see 18 U.S.C. 1001).

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SCHEDULE 13G

EXHIBIT INDEX

EXHIBIT NO. -----	EXHIBIT -----
99.1	Agreement Pursuant to Rule 13d-1(k)(1)(iii) (incorporated by reference to Exhibit 99.1 to the initial filing of this Schedule 13G on February 12, 2007).

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