

SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

SCHEDULE 13G
(Rule 13d-102)

INFORMATION TO BE INCLUDED IN STATEMENTS FILED PURSUANT TO
RULES 13d-1(b)(c), AND (d) AND AMENDMENTS THERETO FILED PURSUANT TO RULE
13d-2(b)
(Amendment No.)1

MacroPore Biosurgery, Inc.

(Name of Issuer)

Common Stock, \$.001 par value

(Title of Class of Securities)

U55396 10 2

(CUSIP Number)

February 8, 2005

(Date of Event Which Requires Filing of this Statement)

Check appropriate box to designate the rule pursuant to which this Schedule is filed:

Rule 13d-1(b)

Rule 13d-1(c)

Rule 13d-1(d)

The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter the disclosures provided in a prior cover page.

The information required in the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

CUSIP NO. U55396 10 2

Page 2 of 6 Pages

1 NAME OF REPORTING PERSON
S.S. or I.R.S. IDENTIFICATION NO. OF ABOVE
PERSON (ENTITIES ONLY)

Neil Gagnon

2 CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP*
(a)
(b)

3 SEC USE ONLY

4 CITIZENSHIP OR PLACE OF ORGANIZATION

United States of America

5 SOLE VOTING POWER

200,859

NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH
6 SHARED VOTING POWER
117,605

7 SOLE DISPOSITIVE POWER
179,845

8 SHARED DISPOSITIVE POWER
606,441

9 AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON
786,286

10 CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES* []

PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW 9
5.6%

12 TYPE OF REPORTING PERSON*

IN

*SEE INSTRUCTION BEFORE FILLING OUT!

Item 1(a) Name of Issuer:

MacroPore Biosurgery, Inc.

Item 1(b) Address of Issuer's Principal Executive Offices:

6740 Top Gun Street
San Diego, CA 92121

Item 2(a) Name of Person Filing:

Neil Gagnon

Item 2(b) Address of Principal Business Office or, if none, Residence:

1370 Avenue of the Americas
Suite 2002
New York, NY 10019

Item 2(c) Citizenship:

United States of America

Item 2(d) Title of Class of Securities:

Common Shares, par value \$.001 per share

Item 2(e) CUSIP Number:

U55396 10 2

Item 3 Type of Reporting Person:

Not Applicable

Item 4 Ownership.

Item 4(a) Amount Beneficially Owned:

As of February 8, 2005, Neil Gagnon beneficially owned 786,286 shares of Common Stock of MacroPore Biosurgery, Inc., which amount includes (i) 111,015 shares beneficially owned by Mr. Gagnon over which he has sole voting and sole dispositive power; (ii) 20,249 shares beneficially owned by Mr. Gagnon over which he has sole voting and shared dispositive power; (iii) 68,780 shares beneficially owned by Lois Gagnon, Mr. Gagnon's wife, over which he has shared voting and shared dispositive power; (iv) 24,480 shares held by the Lois E. and Neil E. Gagnon Foundation

(the "Foundation") (of which Mr. Gagnon is a trustee) over which Mr. Gagnon has shared voting and shared dispositive power; (v) 24,345 shares held by the Gagnon Family Limited Partnership (the "Partnership") (of which Mr. Gagnon is a partner) over which Mr. Gagnon has shared voting and shared dispositive power; (vi) 20,060 shares held by the Gagnon Grandchildren Trust (the "Trust") over which Mr. Gagnon has shared dispositive but no voting power; (vii) 66,690 shares held by a hedge fund (of which Mr. Gagnon is the principal) over which Mr. Gagnon has sole voting and sole dispositive power; (viii) 2,140 shares held by the Gagnon Securities LLC P/S Plan (the "Plan") (of which Mr. Gagnon is a trustee) over which Mr. Gagnon has sole voting and sole dispositive power; (ix) 765 shares held by the Plan over which Mr. Gagnon has sole voting and shared dispositive power; and (x) 447,762 shares held for certain customers of Gagnon Securities LLC (of which Mr. Gagnon is the Managing Member and the principal owner) over which shares Mr. Gagnon has shared dispositive but no voting power.

Item 4(b) Percent of Class:

5.6% beneficially owned by Mr. Gagnon. Calculation of percentage of beneficial ownership is based on 13,927,184 shares of Issuer's Common Stock outstanding as of October 25, 2004 as reported by the Issuer in its Quarterly Report filed on Form 10-Q for the period ended September 30, 2004.

Item 4(c) Number of shares as to which such person has:

- (i) sole power to vote or to direct the vote: 200,859
- (ii) shared power to vote or to direct the vote: 117,605
- (iii) sole power to dispose or to direct the disposition of: 179,845
- (iv) shared power to dispose or to direct the disposition of: 606,441

Items 5-9. Not applicable.

Filing of this statement by the Reporting Person shall not be deemed an admission that he beneficially owns the securities reported herein as held in customer accounts at Gagnon Securities LLC, by the Foundation, the Partnership, the Trust or the Plan. Mr. Gagnon expressly disclaims beneficial ownership of all securities held in such customer accounts or by the Foundation, the Partnership, the Trust or the Plan. No single client's interest as reported in the customer accounts at Gagnon Securities LLC exceeds 5% of the outstanding Common Stock.

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.

March 2, 2005

Date

/s/ Neil Gagnon

Neil Gagnon